CONNECTICUT RIVER FLOOD CONTROL

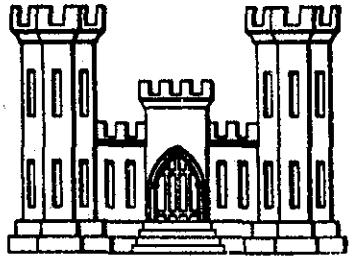
HARTFORD LOCAL PROTECTION

FOLLY BROOK PROJECT

HARTFORD, CONNECTICUT

PROJECT Ht.-13

GENERAL DESIGN MEMORANDUM



Corps of Engineers, U.S. Army - Office of the Division Engineer

New England Division - Boston, Mass.

MAY 1955

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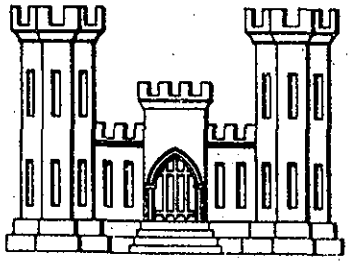

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PERTINENT DATA

I. Physical Features

a. Folly Brook Conduit

1.	9'-0" x 6'-0" conduit, length	804 feet
2.	New invert in existing culvert, length	102 "
3.	10'-0" x 6'x6" conduit, length	1,285 "
4.	Intake, length	27 "
	Total Length	2,218 feet
5.	Design capacity	600 c.f.s.
6.	Drainage area at intake	1,600 acres

b. Folly Brook Dike

1.	Length	590 feet
2.	Maximum height	9 "
3.	Top elevation	42.5 m.s.l.
4.	Design water surface elevation	37.5 "
5.	Top width	10 feet
6.	Side slopes	1 on 2

c. Railroad Stop-Log Structure and Wall

1.	Total length of concrete structures	112 feet
2.	Number of openings	2
3.	Width of each opening	18 feet
4.	Height-base of rail to top of structure, max.	14 "
5.	Elevation top of structure	42.5 m.s.l.
6.	Design water surface elevation	37.5 "

II. Costs

a.	Folly Brook Conduit	$425,300
b.	Folly Brook Dike	13,500
c.	Railroad Stop Log Structure and Wall	53,500
	Total Construction Cost	$492,300
d.	Lands, Rights-of-Way, Easements	13,000
	TOTAL PROJECT COST	$505,300
e.	Federal Cost	$302,900
f.	Local Cost	$202,400

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1. Project authorization. - Construction of local flood-protection works at Hartford, Connecticut was originally authorized by the Flood Control Act approved 28 June 1938, and consisted of earth dikes, flood walls, pumping stations and appurtenant structures, all as described in House Document No. 455, 75th Congress, 2d session. Modifications of the project were authorized as follows:

Act	House Document No.	Modification
Flood Control Act of 18 August 1941	653 - 76th Congress, 3d session	Modified plan in H.D. 455
Public Law 759, approved 26 October 1942	804 - 77th Congress, 2d session	Added Gully Brook Conduit
Flood Control Act of 17 May 1950	-	Added Folly Brook Dike and Conduit

Requirements of local cooperation for the completed portions of the project are as specified in Section 3 of the 1936 Flood Control Act. The work described in this Design Memorandum, consisting of construction of the Folly Brook dike and conduit and a railroad stop log structure, will complete the authorized work at Hartford.

2. Investigations. - Previous surveys and investigations for the Folly Brook dike and conduit, together with costs thereof, were based on preliminary hydrologic and engineering studies. Design of the railroad stop log structure was based on final hydrologic and engineering design as a necessary adjunct to the completed portions of the originally authorized Hartford project. Authorization for the Folly Brook dike and conduit was based on a plan submitted to the Chief of Engineers with letter dated 29 June 1949, subject: Hartford, Connecticut - Local Protective Works - Folly Brook Dike and Conduit.

3. Local Cooperation. - In addition to meeting the requirements of local cooperation specified by Section 3, Flood Control Act of 1936, the city has contributed funds to cover the cost of additional improvements desired by the city. Cost of local cooperation at the time of passage of legislation authorizing the Folly Brook dike and conduit (1950) was estimated at $150,000 for that phase of the work. The unexpended balance of contributed funds still available for the work described herein is

$223,148.56. Conferences have been held with officials of the city of Hartford and the Hartford County Metropolitan District. These officials have concurred in the general plans submitted herewith. The current estimate of cost of local cooperation is $189,400 for construction and $13,000 for lands, easements and rights-of-way. Local interests have purchased or obtained easements and rights-of-way for all but four parcels of property required for construction of the project and are in the process of negotiating for the remaining parcels. Mr. Charles W. Cook, Director of Public Works for the City of Hartford, 550 Main Street, Hartford, Connecticut, is the principal representative responsible for fulfillment of the required conditions of local cooperation.

4. Location of Project and Tributary Area. - The city of Hartford is located in Hartford County, Connecticut, on the west bank of the Connecticut River, 52 miles above its mouth. Folly Brook rises in the town of Wethersfield, to the south of Hartford, flows through the southern portion of Hartford and empties into Wethersfield Cove, which, in turn, empties into the Connecticut River about 0.2 mile below the Hartford-Wethersfield line. Approximately 120 acres of the Folly Brook drainage area in Hartford are subject to flooding from over-bank flow and/or backwater from the Connecticut River. The railroad stop-log structure will be located in the southerly section of Hartford, near the Wethersfield line, at the end of previously completed protective works. Reconstruction of the existing stop-log structure will complete protection for approximately 2,800 acres in Hartford. The locations of the various features of this project are shown on Plate 1.

5. Project Plan. - a. Folly Brook Area. - The plan considered most feasible to accomplish the authorized improvement consists of construction of a pressure conduit and dike as shown on Plate 1. The conduit will extend from an existing conduit upstream to the Hartford-Wethersfield line, passing successively under Franklin Avenue, Montowese Street and Victoria Road. The dike will extend from the corner of Victoria Road and Wethersfield Avenue to high ground in Wethersfield. This dike will prevent backwater from the Connecticut River from flooding the Folly Brook area.

b. Railroad Stop-Log Structure. - The railroad stop-log structure will replace an existing low structure and, together with a concrete wall and short section of earth dike, will complete protection of the Hartford area to design grade. The locations of the structures are shown on Plate 1.

6. Departures from Project Document Plan. a. Folly Brook Area. - The alignment of the dike has been changed slightly at the request of the City. This modification results in including a valuable piece of property within the protected area at no appreciable increase in cost. The size of the conduit has been increased from that shown on plan previously submitted (see paragraph 2 above). The original plan was based

on a conduit having sufficient capacity only to prevent backwater from the Connecticut River from flooding the area. More complete hydrologic studies indicate that increased capacity is required to pass the design flood from Folly Brook. (See discussion under "Hydrology," paragraph 7.)

b. Railroad Stop-Log Structure. - Recent foundation explorations and studies indicate the existing steel sheet pile cut-off and concrete cap under the railroad tracks are adequate and may be incorporated in the new structure. The original plan called for removal and replacement of these features. Some saving in cost is realized by this change.

7. Hydrology and Hydraulic Design. - a. Climatology. - The Hartford, Connecticut weather station, with 30 years of record, provides excellent climatological data applicable to the Folly Brook drainage basin. Average annual precipitation is 42 inches distributed rather uniformly throughout the year including annual snowfall of 40 inches. The average annual temperature is 50°F. with average January temperature of 27°F. and average July temperature of 73°F.

b. Stream Flow Records. - There are no gaging stations on Folly Brook. The U.S. Weather Bureau at Hartford has records of daily readings of the stage of the Connecticut River supplemented by more frequent readings at times of high stage since 1917 and a record of maximum flood stages since about 1840. Backwater from the Connecticut River causes flooding of the lower portion of the Folly Brook area. At the railroad stop log, the area behind the completed protective works would be flooded if the river reaches or exceeds elevation 36.2. At the Memorial Bridge, which crosses the Connecticut River in Hartford, 3.5 miles above the mouth of Folly Brook, conditions of natural flow produced high water marks of 37.0 feet above mean sea level in the March 1936 flood, and 34.8 feet in the September 1938 flood, the two greatest floods of record.

c. Discharge Capacity of Existing Structures. - It is estimated that the existing Folly Brook conduit is capable of carrying between 800 and 900 c.f.s. with the Connecticut River at low stages. It is difficult to determine accurately the capacity of the existing conduit and brook due to sharp bends at the lower end where the brook passes under a highway and railroad. It is expected that these restrictions cause a hydraulic jump to occur within the conduit, where the steep slope tends to produce super-critical flow. It is estimated that the source of this discharge would be divided between the Folly Brook drainage area of 1,600 acres and the area contributing to the Franklin Avenue interceptor sewer system in a proportion of approximately 600 c.f.s. and 250 c.f.s., respectively. Culverts under Montowese Street

and Victoria Road and privately-constructed conduits immediately upstream of Franklin Avenue have inadequate capacity to be incorporated in the pressure conduit. Victoria Road and Montowese Street culverts are about 10'x4.5' and 9'x5', respectively, with discharge capacities limited to 275 c.f.s. and 470 c.f.s. with water levels assumed at the level of the respective streets. Furthermore, their invert grades are higher than necessary for the new conduit. These existing structures will be removed and replaced by the pressure conduit. The existing Franklin Avenue culvert at present has a discharge capacity of about 560 c.f.s. which can be improved by removal of the section upstream of Franklin Avenue and by lowering the invert of the section directly under Franklin Avenue to conform with the proposed pressure conduit design.

d. Design Flood. - (1) Folly Brook Conduit. - Plate 2 is a topographical map showing the Folly Brook watershed above Victoria Road. The watershed is about three miles long and one mile wide, draining an area of 1,600 acres. It flows generally northward to Victoria Road, then eastward toward the Connecticut River where it discharges into Wethersfield Cove. Except in the northwestern portion where Goodwin Park is located, there is a heavy concentration of housing developments around the perimeter of the watershed. About one-third of the drainage basin consists of a low, swampy area below the 50-foot contour. The natural storage existing in the swampy area has a pronounced effect in reducing flood flows in Folly Brook, a fact taken into consideration in determination of the design flood. Yarnell's rainfall data and application of the conventional rational formula was used in lieu of unit graph analysis because of the small drainage area involved and the lack of adequate flood run-off data. The Burkli-Ziegler formula was used as a check of the design flood. A one-hour intensity of rainfall that might be expected one in ten years is 1.9 inches. A frequency of once in 25 years indicates an intensity of 2.2 inches per hour. Various rates of run-off were determined using the 10- and 25-year rainfalls and different coefficients of run-off. Considering the discharge capacity of the existing conduit, the large amount of valley storage in the area, and the results obtained by the use of the two formulae, a design of 600 c.f.s. was adopted for the new conduit.

(2) Folly Brook Dike and Railroad Stop-Log Structure. - Both the Folly Brook Dike and the railroad stop-log structure are designed for a maximum water surface elevation of 37.5 m.s.l., five feet of freeboard, and top elevation of 42.5 m.s.l. which are the design grades for the completed dike immediately adjacent to the stop-log structure.

e. Hydraulic Design, Folly Brook Conduit. - Run-off from the Folly Brook drainage area would be conducted into the new conduit by means of an intake structure. The width of 15 feet at the intake with the sill at elevation 38 was selected to provide adequate inlet capacity to the conduit without setting up undue erosion conditions in the stream bed.

A pressure conduit, 10'-0"x6'-6" with a 6" dish-invert and having a slope of 0.30 percent, is proposed between the entrance, located about 100 feet upstream of Victoria Road, and the upstream face of the Franklin Avenue culvert, a total distance of 1,285 feet. The adopted slope of 0.30 percent satisfies the natural slope of the existing topography, permits the conduit to be constructed under the present highway grades at Montowese Street and Victoria Road, and is low enough at the intake to allow extension into Wethersfield if found desirable in the future. The slope is also hydraulically favorable as it produces normal flow conditions that closely approximate critical flow at all depths. Three bends of about 80 degrees each will be located in this reach of the conduit. Head losses for these bends were assumed to be 0.2 of the velocity head when flowing full and 0.3 of the velocity head when flowing partially full. Head losses at the conduit entrance were taken as 0.2 of the velocity head when flowing full and were neglected when flow was below the roof of the conduit since there is no appreciable transition. Loss of head due to friction was based on Manning's formula with an "n" value of 0.012.

For the remainder of the pressure conduit, a distance of about 800 feet from the downstream side of Franklin Avenue culvert to the existing Folly Brook enclosure, a 9'-0"x6'-0" conduit with a 6" dish-invert is proposed. Immediately below the existing Franklin Avenue culvert, there will be a 6-inch drop in a 15-foot transition between the arched culvert under Franklin Avenue and the new conduit. For the remaining distance, the slope will be 1.034 percent to meet the existing conduit. This steeper slope will provide higher velocities than in the upstream section of the conduit thus permitting the smaller cross-sectional area. For moderate and high discharges the velocity will accelerate to super-critical conditions. However, due to change in grade, the junction with the Franklin Avenue sewer, and curvature in the existing conduit, it is expected that a hydraulic jump will occur and cause the conduit to flow full.

For normal Connecticut River stages, the hydraulic control for high flows is located at the downstream side of the Franklin Avenue culvert where the invert slope changes, while for low flows the control shifts to the intake above Victoria Road. Various discharges were computed to develop a rating curve relating flows to depths at the conduit intake, shown on Plate 3.

For determination of the maximum pressure gradient for structural design of the conduit, consideration was given to the combination of the Connecticut River at flood stage of 40 feet above mean sea level at the mouth of Folly Brook and a flow of 200 c.f.s. through the conduit plus 50 c.f.s. additional below the existing enclosure to allow for storm-sanitary flow from the Franklin Avenue interceptor. The elevation of 40 feet is 2.5 feet below the top elevation of the Folly Brook Dike

and 2.5 feet above the design water surface. This condition produced maximum design criteria from the mouth of the existing conduit to 100 feet below Victoria Road. From there to the intake the maximum pressure gradient was dictated by the design discharge of 600 c.f.s. The pressure gradient determined for the lower portion of the project is considered conservative since the possibility of the occurrence of high stages on the Connecticut River coincident with high flows through the conduit is considered remote. The pressure gradients for the two considered conditions are shown on Plate 4.

8. Geology. - a. General Geology. - The project is located on the broad Triassic Lowland of the Connecticut River Valley where Folly Brook in its course to the river crosses the westerly limits of outwash sediments that mark the former extent of lakes that occupied the valley in the last glacial period. Although the dike is in close proximity to the clay boundary, natural surficial materials under the dike and conduit are principally glacial till overlying relatively shallow sandstone bedrock. The stop-log structure will be founded on the old lake beds which consist of stiff varved clays, considered adequate to support the design loads.

b. Foundation Explorations. - Explorations at the dike site have consisted of cased, drive-sample borings taken to bedrock refusal. Sections of non-exposure of bedrock along the conduit were explored by test pits and probings. Explorations at the stop-log structure site have consisted of one cased, drive-sample boring 30 feet deep and three hand auger borings. Locations and records of subsurface explorations are shown on Plate 5.

9. Other Plans Investigated. - Existing developments in the area precluded practicable alternative locations of the structures.

10. Description of Proposed Structures and Improvements. - a. Folly Brook Conduit. - The pressure conduit will extend from the upstream end of the existing Folly Brook conduit constructed by the city of Hartford, just upstream of the junction of the existing conduit and the Franklin Avenue interceptor sewer. A manhole containing a 5-foot wide by 6-foot high, unseating pressure sluice gate will be constructed in the existing 6-foot diameter brick interceptor sewer to prevent backwater during a Connecticut River flood. The new conduit from the junction with the existing conduit to just downstream of Franklin Avenue, will be of reinforced concrete, 9 feet wide by 6 feet high at the center and 5.5 feet high at the sides, providing a waterway area of 51.75 square feet. The slope of the conduit will be 0.01034. Plans and profiles of the conduit in this reach of the brook are shown on Plates 6 thru 8. Structural details of the conduit are shown on Plate 7.

The existing Franklin Avenue culvert is a concrete arch, 15 feet wide by about 6 feet high. It is proposed to leave this culvert in place and construct a new concrete invert in the present ledge invert which is being eroded in places. Details of the existing arch and new invert are shown on Plate 8. A short (15-foot) transition section will be required between the arch culvert and the proposed conduit.

Upstream of Franklin Avenue, the conduit slope flattens to 0.0030, requiring a conduit 10 feet wide by 6.5 feet high at the center and 6 feet high at the sides, providing a waterway area of 62.5 square feet. This section is typical for the remainder of the conduit. Plans and profiles of this section of the conduit are shown on Plates 9 through 13. Structural details of the conduit are shown on Plate 10. Immediately upstream of Franklin Avenue are a series of short, privately-constructed culverts of inadequate capacity and in poor condition. These will be removed and replaced by the new conduit. The existing culverts under Montowese Street and Victoria Road also have inadequate capacity and will be replaced by the new conduit. Details of the alterations to the existing sewer lines necessitated by the proposed construction are being developed in cooperation with the Hartford County Metropolitan District, the agency charged with construction and maintenance of sewers in the Hartford area.

The intake to the new conduit is located about 100 feet upstream of Victoria Road, at the Hartford-Wethersfield line. The intake consists of wing walls with top at elevation 44.0 and a concrete dished slope to the conduit invert. The intake is 15 feet wide at the upstream end, narrowing to 10 feet wide at the conduit portal. Details of the intake are shown on Plate 13.

b. Folly Brook Dike. - The Folly Brook Dike is approximately 590 feet long, with a top width of 10 feet, side slopes of 1 on 2 and a maximum height of about 9 feet above existing ground surface. The dike will be homogeneous in section, with a cut-off trench at the river-side toe. The plan, profile and typical section of the proposed dike are shown on Plate 14. Since the dike is subject only to backwater from the Connecticut River and not to direct wave action, it is considered sufficient to topsoil and seed both slopes. The dike is designed with 5 feet of freeboard based on a maximum potential fetch of 2 miles. At time of design flood stage (elevation 37.5) it would be necessary to sandbag from the proposed dike across Wethersfield Avenue to high ground. Since sandbagging would be required only to maintain the 5 feet of freeboard, such emergency provision appears justifiable.

c. Railroad Stop-Log Structure. - The new railroad stop-log structure is located at the extreme south-westerly end of the otherwise completed Hartford local protection works. An existing dike and stop-log structure was constructed in this location after the 1936 flood but before the 1938 flood. Following the second flood, raising the grade

of the entire Hartford project was authorized. With the exception of the work described herein, the entire protective works have been constructed to the higher grade.

The new construction will incorporate portions of the existing structures. The existing steel sheet pile cut-off and concrete cap under the railroad tracks will remain in place. A new reinforced concrete wall is required at the east end of the stop-log structure to retain the additional fill required to raise the adjoining earth dike to design grade. The wall will have a maximum height of about 14 feet above the base. Reinforced concrete T walls will be constructed between the two sets of tracks and to the west of the tracks. The openings for the tracks will be 18 feet wide and, at times of high water, will be closed with aluminum beams and panels. When not in use, the aluminum beams and panels will be stored in a shelter to be constructed at the landside toe of the dike. The plan, elevations and sections of the proposed work are shown on Plates 15 through 17.

d. Structural Design. - The structures are all designed in accordance with applicable Engineering Manuals for Civil Works Construction and Civil Works Engineer Bulletins. The conduit has been designed to withstand internal water pressure due to backwater from the Connecticut River and from the Folly Brook design flow. The design pressure gradients are shown on Plate 4. External loads on the conduit include backfill to the grades shown on Plate 4 plus a uniform load equivalent to an H-20 loading where the conduit passes under existing streets and below Franklin Avenue where the City is proposing a new street. The walls and stop-log structure have been designed for a maximum water surface at elevation 42.5

11. Sources of Construction Materials. - a. Concrete Aggregates. - In view of the small quantity of concrete (about 3,500 c.y.) required for this project, aggregate investigations have been limited to review of existing test data on commercial sources from which aggregates were used or accepted for use on other civil works projects. There are several sources producing coarse aggregate from the Connecticut Valley traprock ridges west of the Connecticut River. The following sources of coarse aggregates are considered acceptable:

(1) Edward E. Balf Co. at Newington, Connecticut, producer of crushed traprock used on construction of the Bushnell Park Pumping Station of the Hartford Flood Protection Works.

(2) Arborio & Sons, Inc. at Farmington, Connecticut, producer of crushed traprock tested acceptable for, but not used in, the construction of Mansfield Hollow Dam.

(3) The New Haven Trap Rock Company Quarries at Plainville and Rocky Hill, Connecticut are lithologically similar to the preceding source.

(4) The York Hill Trap Rock Company at Meriden, Connecticut produces coarse aggregate tested acceptable for, but not used in, construction of Mansfield Hollow Dam.

Sources of natural fine aggregate considered acceptable are rather limited because of the predominance of poor quality red sands in this area which were derived from the weak triassic sandstones. However, the Edward E. Balf Co. and the Dunning Sand & Gravel Company process sand and gravel at Farmington, Connecticut where natural materials were derived from other than sandstone. Both fine and coarse aggregates from these sources were tested acceptable for construction of pumping stations for the Hartford Flood Protection Works.

b. Embankment Material. - Impervious and random borrow will be obtained from Borrow Area "H", a city-owned pit located in the town of Rocky Hill, about 3.5 miles from the Folly Brook dike. The formation is composed of two types: (1) medium to fine silt; and (2) mixed materials graded from gravel and coarse sand to fine silt. Materials from this borrow area were used in completed portions of the Hartford dikes.

12. Real Estate Requirements. - The city of Hartford, as the local interest responsible for complying with the requirements of local cooperation, has purchased in fee or obtained easements over all but four parcels of land required for construction of the project and are presently negotiating for these remaining parcels. It is anticipated that all lands required for the project will be available prior to 30 June 1955.

13. Relocations. - There are no major relocations involved in the project. Short sections of sewer lines which require modification due to the construction will be in accordance with design standards of the Hartford County Metropolitan District. Short sections of streets and sidewalks which must be torn up will be replaced in kind in accordance with specifications of the city of Hartford.

14. Cost Estimates. - The total estimated cost of the project, exclusive of lands and rights-of-way, is $492,300, which is the same as the latest approved estimate. A summary of the costs of the various features of the work described in this design memorandum is given in Table I. Breakdown estimates are given in Table II.

TABLE I

SUMMARY OF COSTS
(April 1955 Price Level)

1. Construction		
Folly Brook Conduit	$ 371,100	
Folly Brook Dike	11,800	
Railroad Stop-Log Structure	46,700	
Total Contract Cost	$ 429,600	
Indirect Costs	62,700	
Total Construction Cost		$ 492,300
2. Real Estate		
Lands, Rights-of-Way, etc.		13,000
Total Project Cost		$ 505,300
Allocation of Costs		
Federal Costs		$ 302,900
Local Costs		
Cash Contribution	$ 189,400	
Lands, etc.	13,000	
Total Local Costs		202,400
Total Project Cost		$ 505,300

TABLE II

BREAKDOWN OF COSTS
(April 1955 Price Level)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount	
1	Folly Brook Conduit					
	a. Preparation of site	7.25	A	$400	$ 2,900	
	b. Care and diversion of water	Lump Sum			15,000	
	c. Earth excavation	11,000	c.y.	1.75	19,250	
	d. Rock excavation	650	c.y.	10.	6,500	
	e. Backfill, random	17,000	c.y.	0.50	8,500	
	f. Backfill, borrow	7,000	c.y.	1.50	10,500	
	g. Concrete	2,950	c.y.	60.00	177,000	
	h. Steel reinforcement	320,000	lbs.	0.12	38,400	
	i. Chain link fence	75	l.f.	3.00	225	
	j. Sheathing	9,000	s.f.	1.50	13,500	
	k. Manhole for 5'x6' gate	Lump Sum			4,400	
	l. 5'x6' gate and hoist	" "			3,200	
	m. Catch basin - 12"x18"x24"	" "			100	
	n. Catch basins - 18"x18"x42"	4	ea.	200	800	
	o. Move and reset 4-car garage	Lump Sum			1,375	
	p. Move and reset 2-car garage	" "			800	
	q. Relocate 6" house connection	" "			500	
	r. Montowese Street siphon	" "			1,900	
	s. Removal of Franklin Ave. culverts	" "			12,900	
	t. Removal of Montowese St. culvert	" "			6,150	
	u. Removal of Victoria Rd. culvert	" "			3,100	
	v. Manhole for 18" drain	" "			400	
	w. 18" sluice gate	" "			700	
	x. 18" flap valve	" "			300	
	Sub-total				$328,400	
	Contingencies				42,700	
	Construction cost, Folly Brook Conduit					$371,100

TABLE II (cont'd)

BREAKDOWN OF COSTS

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount	
2	Folly Brook Dike					
	a. Stripping	1,300	c.y.	$0.75	$ 975	
	b. Excavation	700	c.y.	1.00	700	
	c. Topsoil and seeding	1,500	c.y.	0.50	750	
	d. Random fill	4,100	c.y.	0.25	1,025	
	e. Random borrow	4,200	c.y.	1.50	6,300	
	f. Gravel road surface	150	c.y.	2.00	300	
	g. Removal of garage	Lump Sum			400	
	Sub-total				$10,450	
	Contingencies				1,350	
	Construction Cost, Folly Brook Dike					$11,800
3	Railroad Stop-Log Structure					
	a. Preparation of site	0.5	A	$400	$ 200	
	b. Excavation, common	1,700	c.y.	0.80	1,360	
	c. Removal of existing concrete	85	c.y.	10	850	
	d. Random fill	900	c.y.	0.30	270	
	e. Impervious fill	400	c.y.	0.40	160	
	f. Borrow, impervious	500	c.y.	1.50	750	
	g. Topsoil and seeding	600	s.y.	0.30	180	
	h. Filter sand	35	c.y.	2.00	70	
	i. Filter gravel	20	c.y.	3.00	60	
	j. 6" V.C. pipe	90	l.f.	3.00	270	
	k. 6" A.C.C.M.P. pipe	50	l.f.	3.00	150	
	l. Concrete, mass	4	c.y.	50	200	
	m. Concrete, reinforced	350	c.y.	60	21,000	
	n. Steel reinforcement	44,000	lbs.	0.12	5,280	
	o. Gravel ballast	20	c.y.	3.00	60	
	p. Gravel road surface	20	c.y.	3.00	60	

TABLE II (cont'd)

BREAKDOWN OF COST

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount	
3	Railroad Stop-Log Structure (cont'd)					
	q. Miscellaneous metals	4,600	lbs.	$0.25	$ 1,150	
	r. Raising existing manhole	Lump Sum			400	
	s. Tar and gravel roofing	300	s.f.	0.30	90	
	t. Overhead door	Lump Sum			200	
	u. Wood ties	15	ea.	6.00	90	
	v. Aluminum stop logs	6,100	lbs.	1.40	8,540	
	Sub-total				$41,390	
	Contingencies				5,310	
	Construction Cost, Stop-Log Structure					$46,700
	Total Contract Cost					$429,600
4	Indirect Costs					
	a. Engineering & Design					
	(1) Planning			$ 25,000		
	(2) Eng. during construction			4,300		
	(3) Record drawings			500		
					$29,800	
	b. Supervision & Administration					
	(1) Supervision & Inspection			$ 17,200		
	(2) Overhead			15,700		
					$32,900	
	Total Indirect Costs					$ 62,700
	Total Construction Cost					$492,300
5	Real Estate					
	Lands, Rights-of-way, etc.					13,000
	Total Project Cost					$505,300

15. Schedules for Design and Construction. - It is estimated that 10 months will be required for construction of the project which will be by contract. Contract plans and specifications are scheduled for completion by 30 June 1955. Funds in the amount of $263,000 are required in Fiscal Year 1956 for construction of the project.

16. Operation and Maintenance. - Upon completion of the construction, the project will be turned over to the city of Hartford for operation and maintenance in accordance with prescribed regulations. The organization already set up by the city for maintenance and operation of the Hartford local protection works will assume maintenance and operation of this project. Key personnel in this organization are listed below:

Superintendent of Maintenance and Operation of Flood Protection System

Charles W. Cooke, Director of Public Works

Deputy Superintendent of Maintenance and Operation of Flood Protection System

Lyman C. Lovell, Deputy Director of Public Works

Pumping Station Operators

B.F. Buckland
Donald DiCioccio

Annual costs to local interests for operation and maintenance of this phase of the Hartford project are estimated to be $1,200. A breakdown of total annual costs is given in Table III, on page 16.

17. Benefits. - a. Folly Brook Dike and Conduit. - Over 40 residential structures, a large community building and a private hospital have frequently experienced flood damages in the Folly Brook area. In addition, the higher floods inundate northward along Franklin Avenue, a principal north-south thoroughfare, which prevents access to approximately 200 homes and several commercial establishments. In the area affected are two printing firms and several stores. Annual benefits under existing conditions are estimated to be $24,000. The Connecticut State Highway Department is presently planning for the construction of an office building and garage in the area which will serve as their headquarters as an estimated cost of $3,000,000. In addition to the proposed State Highway Department Headquarters buildings, local agencies and property owners presently plan a substantial development in the area. Upon completion of the proposed improvements, it is estimated that annual losses would be increased by $8,000 if the dike and conduit were not constructed. These losses would be prevented by the project.

Total benefits for the Folly Brook portion of the work are $32,000. Annual costs are estimated to be $17,260 resulting in a benefit-cost ratio of 1.9 to 1.

b. - Railroad Stop-Log Structure. - Whenever Connecticut River stages exceed elevation 36.2 feet, m.s.l., flood waters would overtop the existing stop-log structure, flank the completed portions of the Hartford dikes and flood walls and inundate a large area of Hartford. This area is occupied by the municipal airport, the Connecticut Regional Market serving a large number of produce dealers, a firearms plant, a large housing development, and many other commercial and industrial establishments. The annual benefits that would result from raising the stop-log structure and dike to the grade of the completed portions of the Hartford Protective Works (elevation 42.5 m.s.l.), with the existing upstream reservoirs, are estimated to be $12,000. Annual costs for this feature are estimated to be $2,160, resulting in a benefit-cost ratio of 5.6 to 1.

c. - Total. - Total benefits for the work described in this design memorandum are $44,000. Total annual costs are $19,420 resulting in an over-all benefit-cost ratio of 2.3 to 1.

TABLE III

ANNUAL COSTS

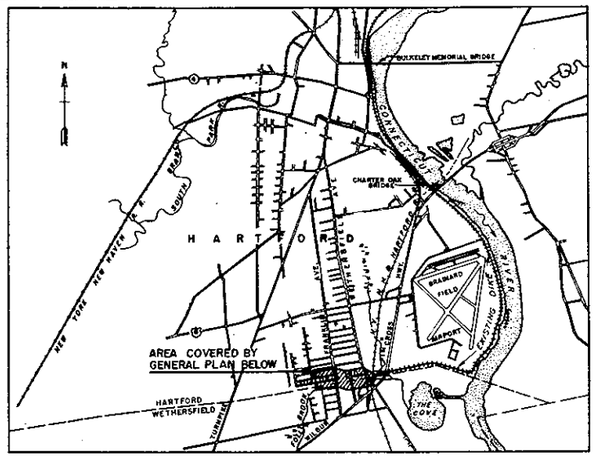
Item	Folly Brook Dike & Conduit		Stop-Log Structure		Total	
1. Federal Investment						
a. Federal first cost	$270,000		$ 32,900		$302,900	
b. Interest during construction	0		0		0	
c. Total Federal Investment	$270,000		$ 32,900		$302,900	
2. Federal Annual Charges						
a. Interest	$ 6,750		$ 820		$ 7,570	
b. Amortization	2,770		340		3,110	
Total Federal Annual Charges		$ 9,520		$ 1,160		$10,680
3. Non-Federal Investment						
a. Contributed funds	$168,800		$ 20,600		$189,400	
b. Lands, easements, etc.	11,000		2,000		13,000	
c. Total non-Federal first cost	$179,800		$ 22,600		$202,400	
d. Interest during construction	0		0		0	
e. Total Non-Federal Investment	$179,800		$ 22,600		$202,400	
4. Non-Federal Annual Charges						
a. Interest	$ 4,500		$ 570		$ 5,070	
b. Amortization	1,840		230		2,070	
c. Maintenance & operation	1,100		100		1,200	
d. Net loss of taxes	300		100		400	
e. Total Non-Federal Annual Charges		$ 7,740		$ 1,000		$ 8,740
5. Total Annual Charges		$17,260		$ 2,160		$19,420

INDEX TO PLATES

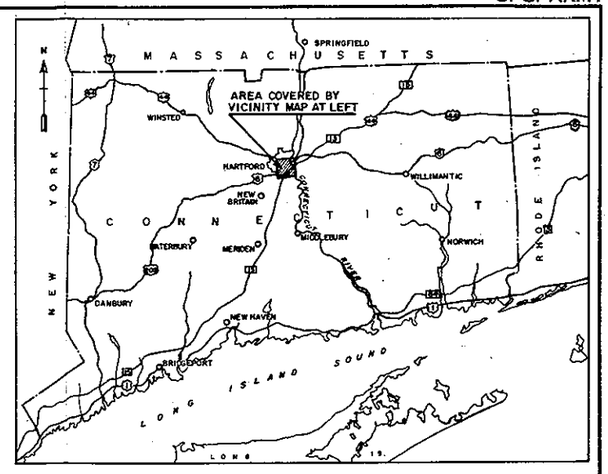
Plate No.	Title
1	Project Location and Index
2	Folly Brook Watershed
3	Rating Curve at Conduit Entrance
4	Profile Along Proposed Center Line
5	Plan & Record of Explorations
6	Folly Brook Conduit - Plan & Profile No. 1
7	" " " " " " 2
8	" " " " " " 3
9	" " " " " " 4
10	" " " " " " 5
11	" " " " " " 6
12	" " " " " " 7
13	" " " " " " 8
14	Folly Brook Dike - General Plan, Profile & Section
15	South End Dike & Stop-Log Structure - General Plan & Section
16	" " " " " " Sections No. 1
17	" " " " " " Sections No. 2

CORPS OF ENGINEERS

U. S. ARMY



VICINITY MAP
SCALE IN MILES
0.5 0 0.5 1



LOCATION MAP
SCALE IN MILES
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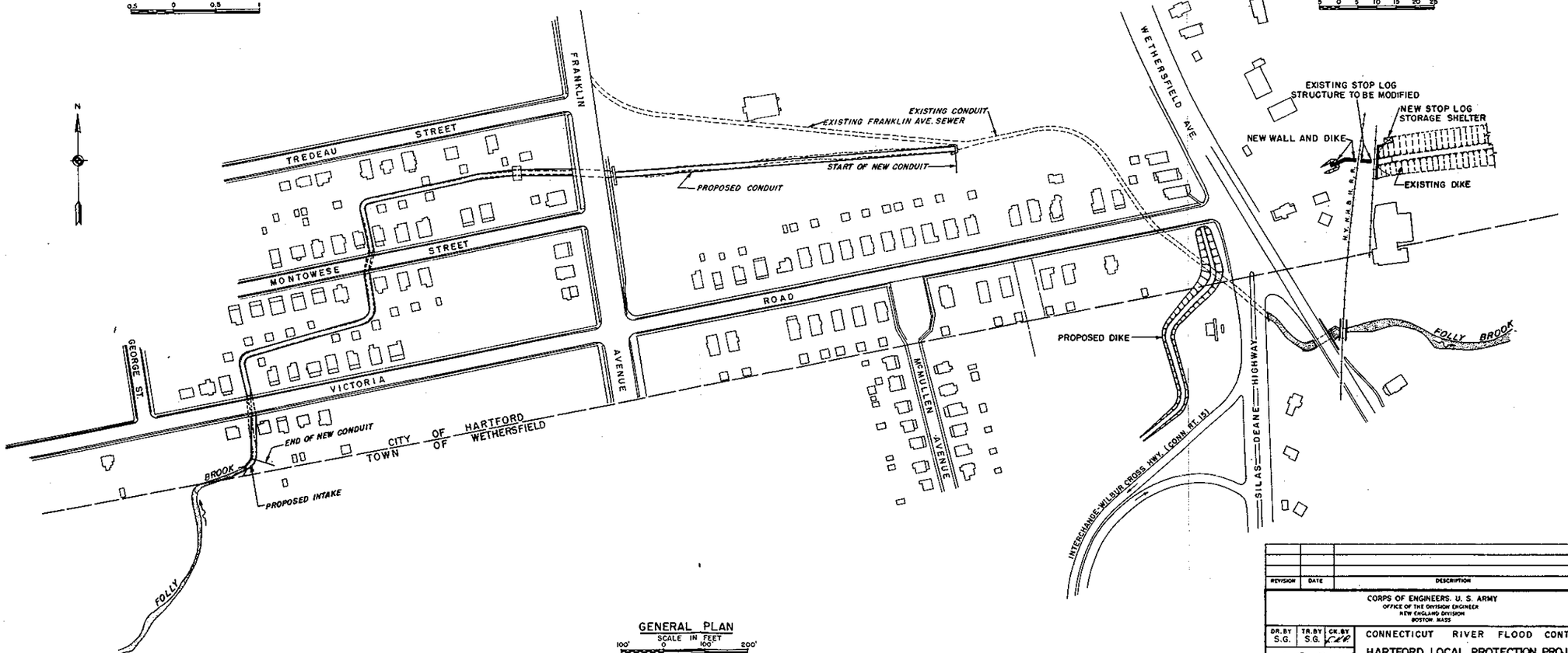


GENERAL PLAN
SCALE IN FEET
100' 0 100' 200'

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
S.G.	S.G.	C.C.P.

PROJECT ENGINEER

SUBMITTED BY
CHIEF, PLANS & SPEC'S BRANCH

APPROVED
CHIEF, ENGINEERING DIV.

CONNECTICUT RIVER FLOOD CONTROL
HARTFORD LOCAL PROTECTION PROJECT
PROJECT LOCATION & INDEX
HARTFORD CONNECTICUT

APPROVED
LT. COL., C.E., FOR THE DIVISION ENGINEER
DATE MAY 1955

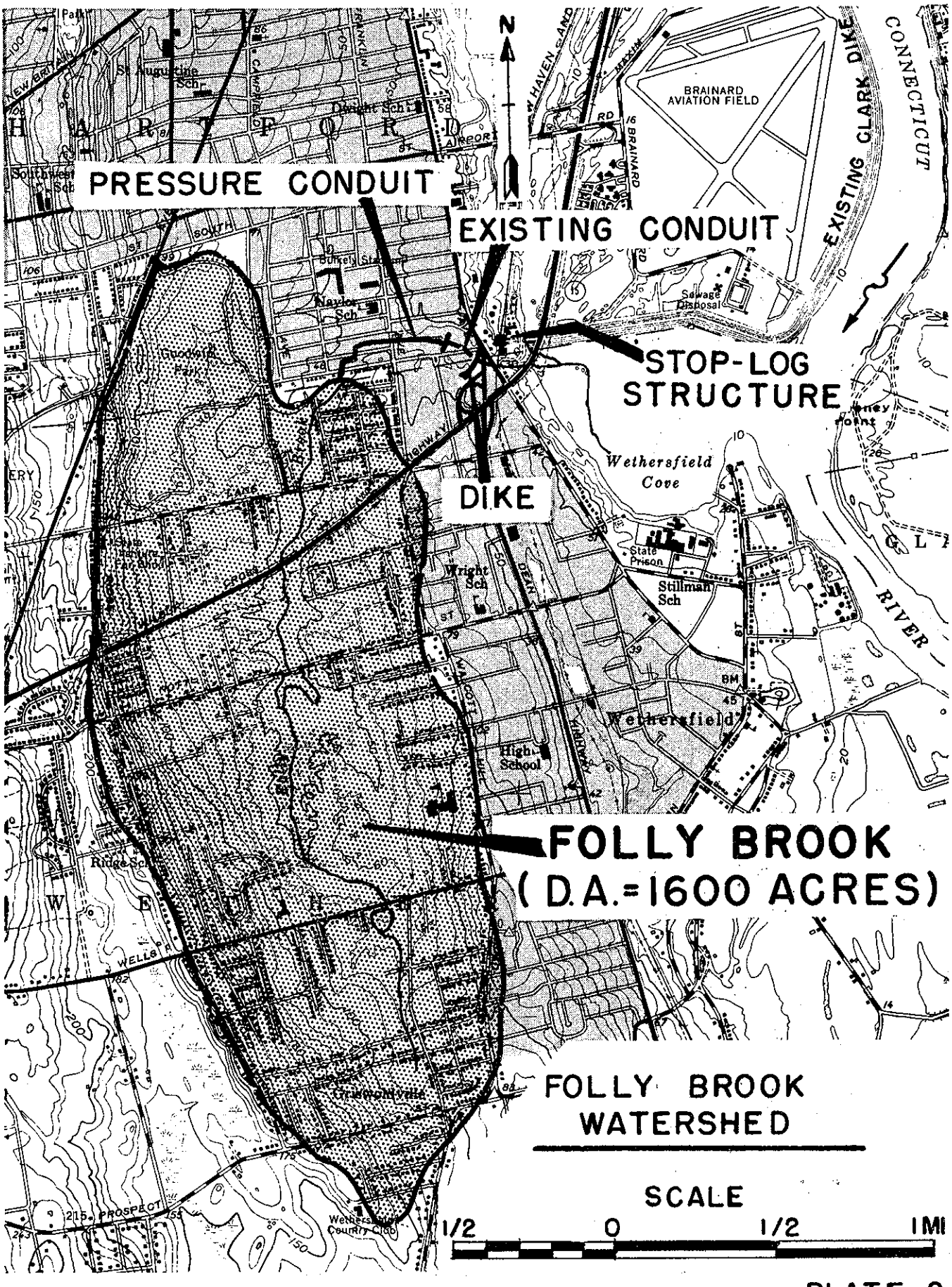
TO ACCOMPANY DESIGN MEMORANDUM
DATED: MAY 1955

SCALE 1" = 100'

DRAWING NUMBER
CT-4-4050

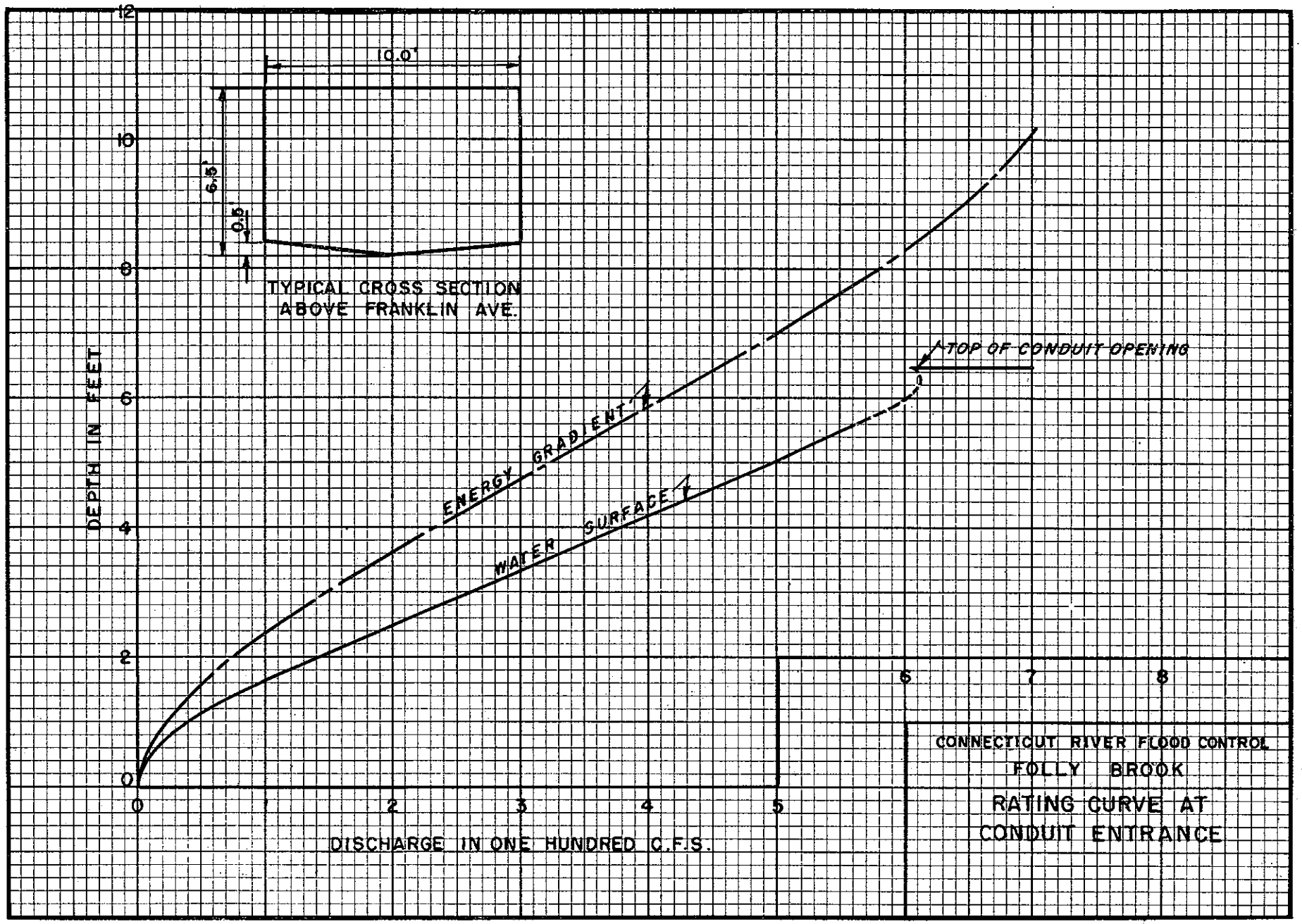
SHEET OF

PLATE I



FOLLY BROOK WATERSHED

PLATE 2



CONNECTICUT RIVER FLOOD CONTROL

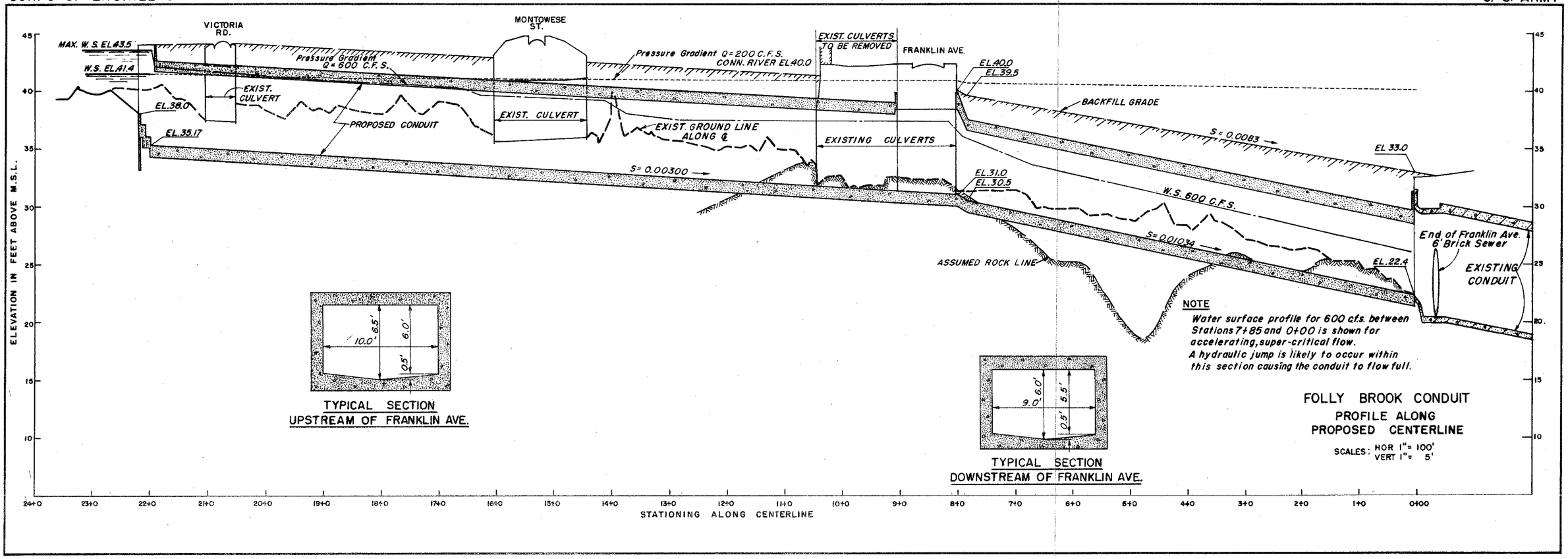
FOLLY BROOK

RATING CURVE AT
CONDUIT ENTRANCE

PLATE 3

CORPS OF ENGINEERS

U. S. ARMY



TYPICAL SECTION
UPSTREAM OF FRANKLIN AVE.

TYPICAL SECTION
DOWNSTREAM OF FRANKLIN AVE.

NOTE

Water surface profile for 600 cfs. between Stations 7+85 and 0+00 is shown for accelerating, super-critical flow. A hydraulic jump is likely to occur within this section causing the conduit to flow full.

FOLLY BROOK CONDUIT

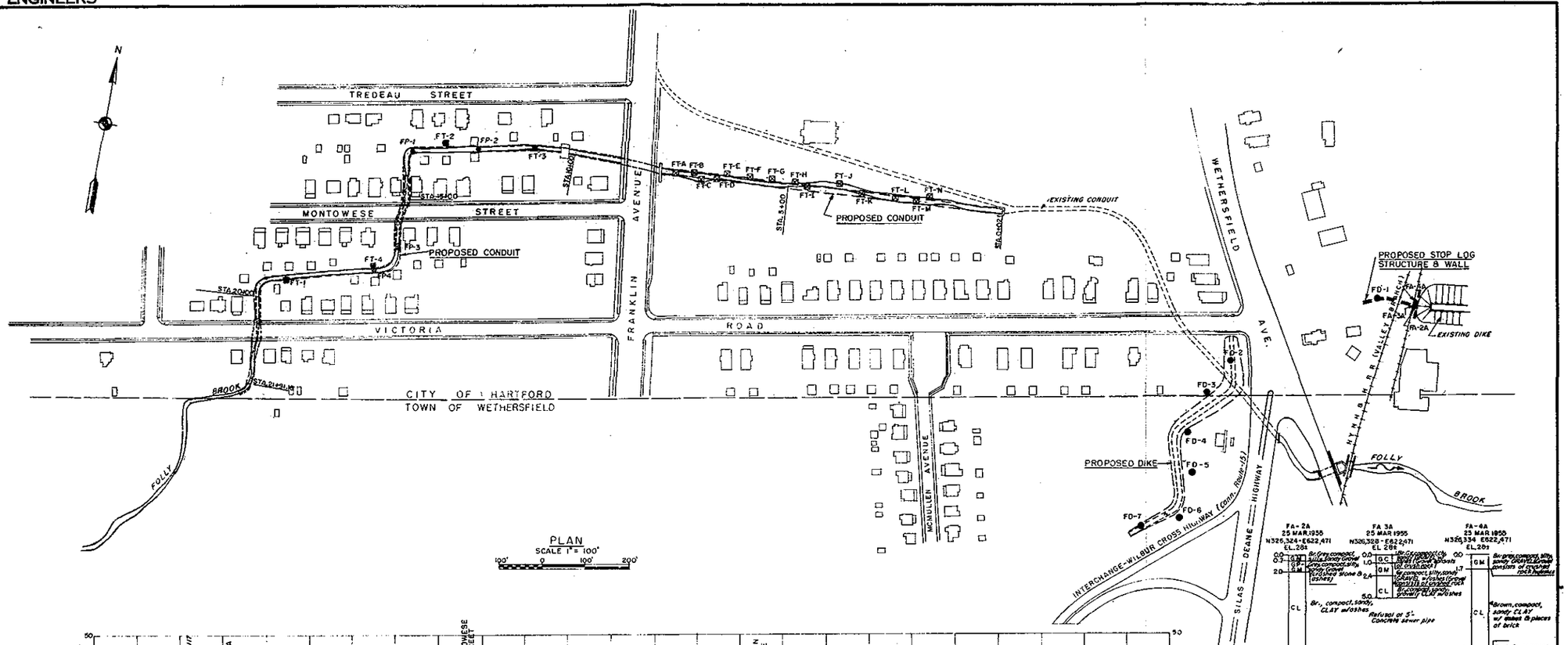
PROFILE ALONG PROPOSED CENTERLINE

SCALES: HOR 1" = 100'
VERT 1" = 5'

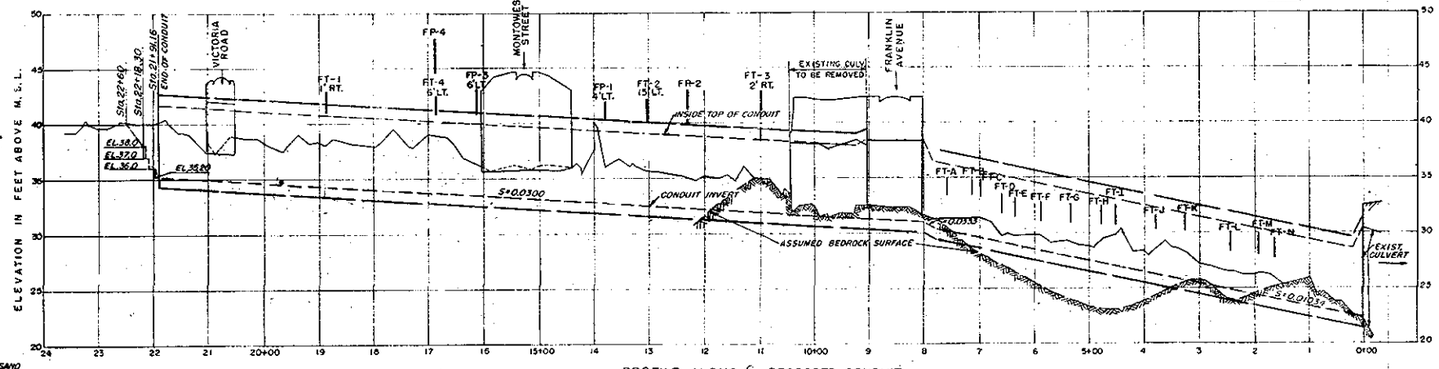
PLATE 4

CORPS OF ENGINEERS

U. S. ARMY

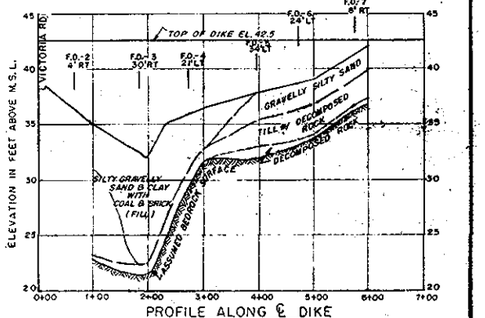


METROPOLITAN DISTRICT EXPLORATIONS (1948)		
EXPLOR NO.	APPROX GR. EL.	REPORTED DEPTH TO BEDROCK, FT
FT A	30.7	0.6
FT B	31.3	2.8
FT C	30.5	2.6
FT D	30.7	4.2
FT E	31.3	6.0
FT F	31.3	6.0
FT G	31.3	9.8
FT H	21.4	8.9
FT I	28.5	8.9
FT J	28.0	3.5
FT K	28.4	2.2
FT L	27.6	3.2
FT M	27.2	2.7
FT N	26.6	1.2



PROFILE ALONG ℄ PROPOSED CONDUIT

SCALE: HOR 1" = 100'
VERT 1" = 5'

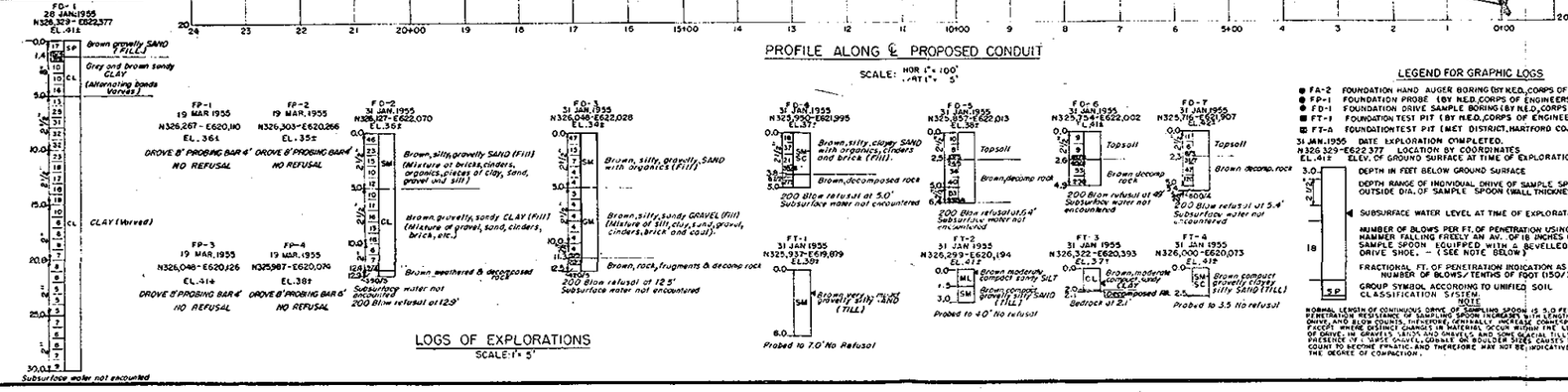


PROFILE ALONG ℄ DIKE

SCALE HOR. 1" = 100'
VERT. 1" = 5'

LOGS OF EXPLORATIONS

SCALE: 1" = 5'



LEGEND FOR GRAPHIC LOGS

- FA-2 FOUNDATION HAND AUGER BORING (BY N.E.D., CORPS OF ENGINEERS)
- FP-1 FOUNDATION PROBE (BY N.E.D., CORPS OF ENGINEERS)
- FD-1 FOUNDATION DRIVE SAMPLE BORING (BY N.E.D., CORPS OF ENGRS.)
- FT-1 FOUNDATION TEST PIT (BY N.E.D., CORPS OF ENGINEERS)
- FT-A FOUNDATION TEST PIT (MET. DISTRICT, HARTFORD CO. CONN.)

31 JAN. 1955 DATE EXPLORATION COMPLETED.
N326,329 - E622,377 LOCATION BY COORDINATES
EL. 41.2 ELEV. OF GROUND SURFACE AT TIME OF EXPLORATION

3.0 DEPTH IN FEET BELOW GROUND SURFACE
2 1/2" DEPTH RANGE OF INDIVIDUAL DRIVE OF SAMPLE SPOON AND OUTSIDE DIA. OF SAMPLE SPOON (WALL THICKNESS 1/4 - IN.)
SUBSURFACE WATER LEVEL AT TIME OF EXPLORATION
18 NUMBER OF BLOWS PER FT. OF PENETRATION USING A 350 LB. HAMMER FALLING FREELY AN AV. OF 18 INCHES ON A SAMPLE SPOON EQUIPPED WITH A BEVELED DRIVE SHOE. - (SEE NOTE BELOW)
FRACTIONAL FT. OF PENETRATION INDICATION AS FOLLOWS: NUMBER OF BLOWS / TENTHS OF FOOT (ISO/53)
SP GROUP SYMBOL ACCORDING TO UNIFIED SOIL CLASSIFICATION SYSTEM.

NOTE

NORMAL LENGTH OF CONTINUOUS DRIVE OF SAMPLING SPOON IS 5.0 FEET. PENETRATION RESISTANCE OF SAMPLING SPOON THOROUGHLY WITH LENGTH OF DRIVE AND BLOW COUNTS, THEREFORE, GENERALLY INCREASE CONSIDERABLY WITH DEPTH. THE PRESENCE IN THE SOIL AT INTERVALS OF GRAVEL, COBBLES OR BOULDERS SIZED APPROXIMATELY EQUAL TO OR GREATER THAN THE DIAMETER OF THE SAMPLING SPOON CAUSES THE BLOW COUNT TO BECOME ERRATIC AND THEREFORE MAY NOT BE INDICATIVE OF THE DEGREE OF COMPACTION.

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
C.A.M.	S.G.	[illegible]

K.G. Ewell
CHIEF N.E.D. LABORATORIES

SUBMITTED BY [signature]
CHIEF PLANS & SPEC'S BRANCH

APPROVED [signature]
CHIEF ENGINEERING DIV.

CONNECTICUT RIVER FLOOD CONTROL

PLAN AND RECORD OF EXPLORATIONS

HARTFORD CONNECTICUT

APPROVED [signature] DATE MAY 1955
LT. COL. C. E., FOR THE DIVISION ENGINEER

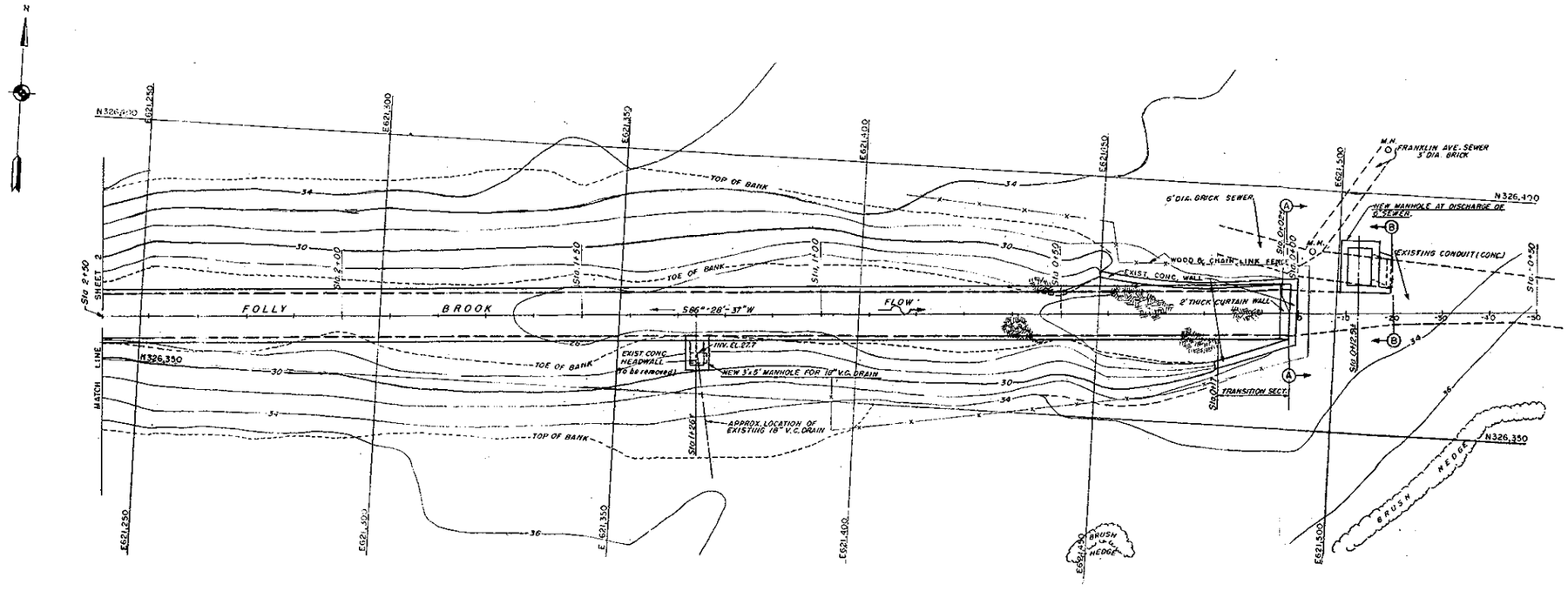
TO ACCOMPANY DESIGN MEMORANDUM DATED: MAY 1955

SCALES AS SHOWN

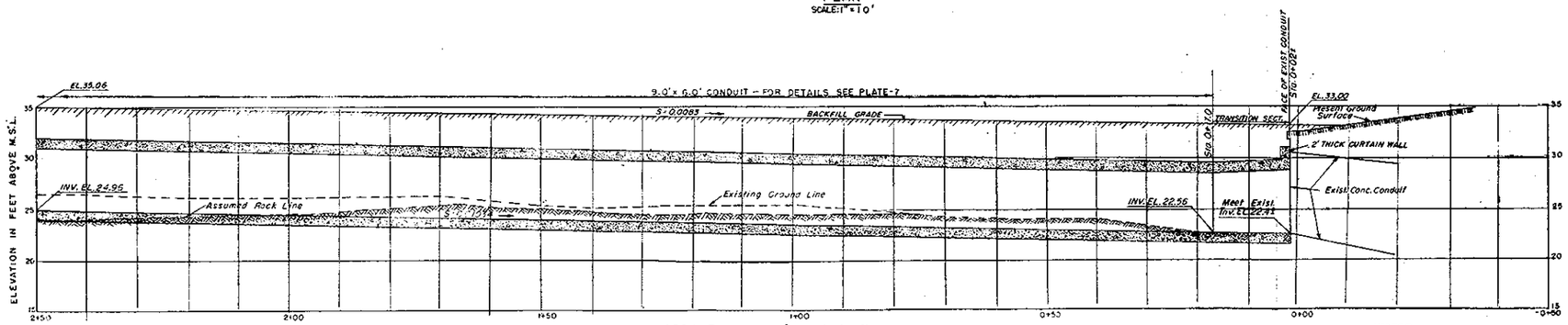
DRAWING NUMBER
CT-2-1456

SHEET OF

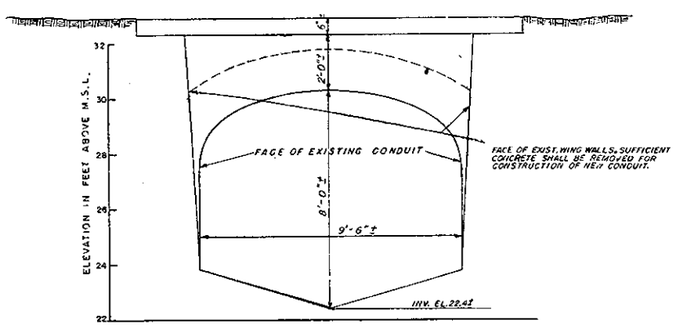
PLATE 5



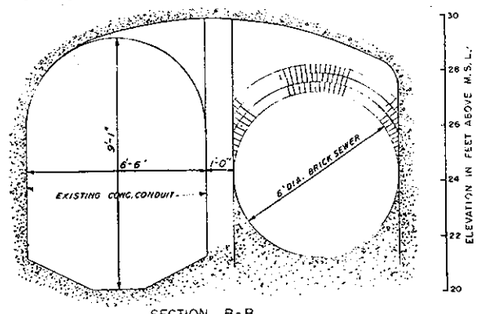
PLAN
SCALE: 1" = 10'



PROFILE ALONG ℄ CONDUIT
SCALE: HOR 1" = 10'
VERT 1" = 5'



SECTION A-A
SCALE ½" = 1'-0"



SECTION B-B
SCALE ½" = 1'-0"

NOTES:
Sta 0+00 is drill hole in concrete headwall over entrance to existing Folly Brook conduit, Elevation 32.37 M.S.L; Coordinates N326,374.25', E621,492.21.

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
S.G.	S.G.	

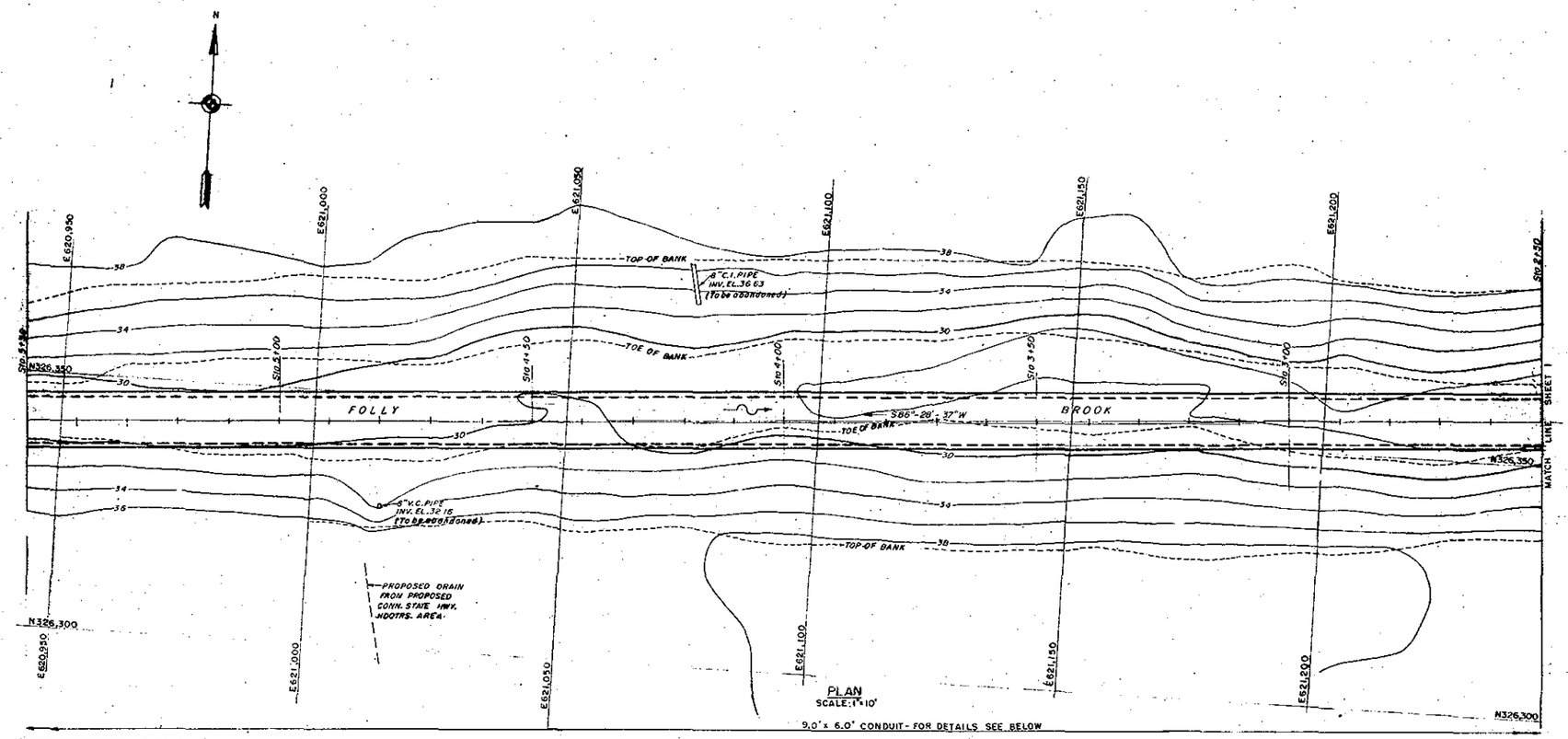
PROJECT ENGINEER
SUBMITTED BY:
CHIEF PLANS & SPEC'S BRANCH
APPROVED
CHIEF ENGINEERING DIV.

CONNECTICUT RIVER FLOOD CONTROL
FOLLY BROOK CONDUIT
PLAN AND PROFILE NO. 1

HARTFORD CONNECTICUT
APPROVED
LT. COL. C.E., FOR THE DIVISION ENGINEER
DATE MAY 1955

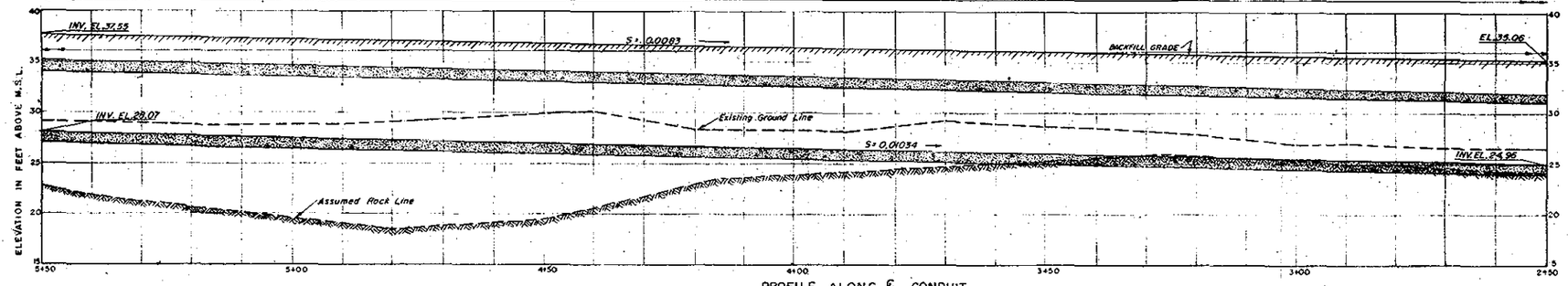
TO ACCOMPANY DESIGN MEMORANDUM
DATED: MAY 1955

SCALES AS SHOWN
DRAWING NUMBER
CT-4-4051
SHEET OF

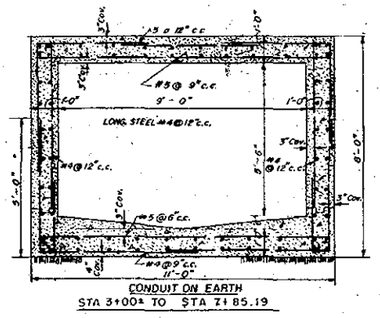


PLAN
SCALE: 1" = 10'

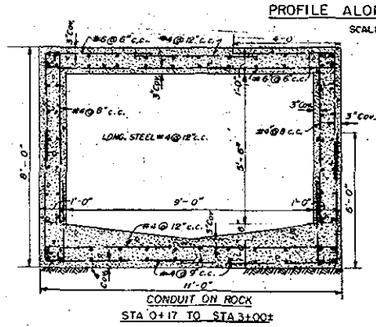
9.0' x 6.0' CONDUIT - FOR DETAILS SEE BELOW



PROFILE ALONG ℄ CONDUIT
SCALE: HOR. 1" = 50'
VERT. 1" = 5'

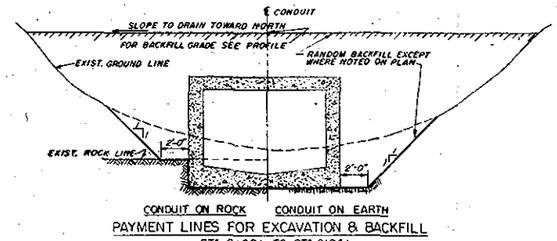


CONDUIT ON EARTH
STA 3+00± TO STA 2+85.19



CONDUIT ON ROCK
STA 0+17 TO STA 3+00±

9'-0" x 6'-0" CONDUIT DETAILS
SCALE: 1/2" = 1'-0"



CONDUIT ON ROCK CONDUIT ON EARTH
PAYMENT LINES FOR EXCAVATION & BACKFILL
STA. 0+02± TO STA. 8+04±
SCALE 1/4" = 1'-0"

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
S.G.	S.G.	

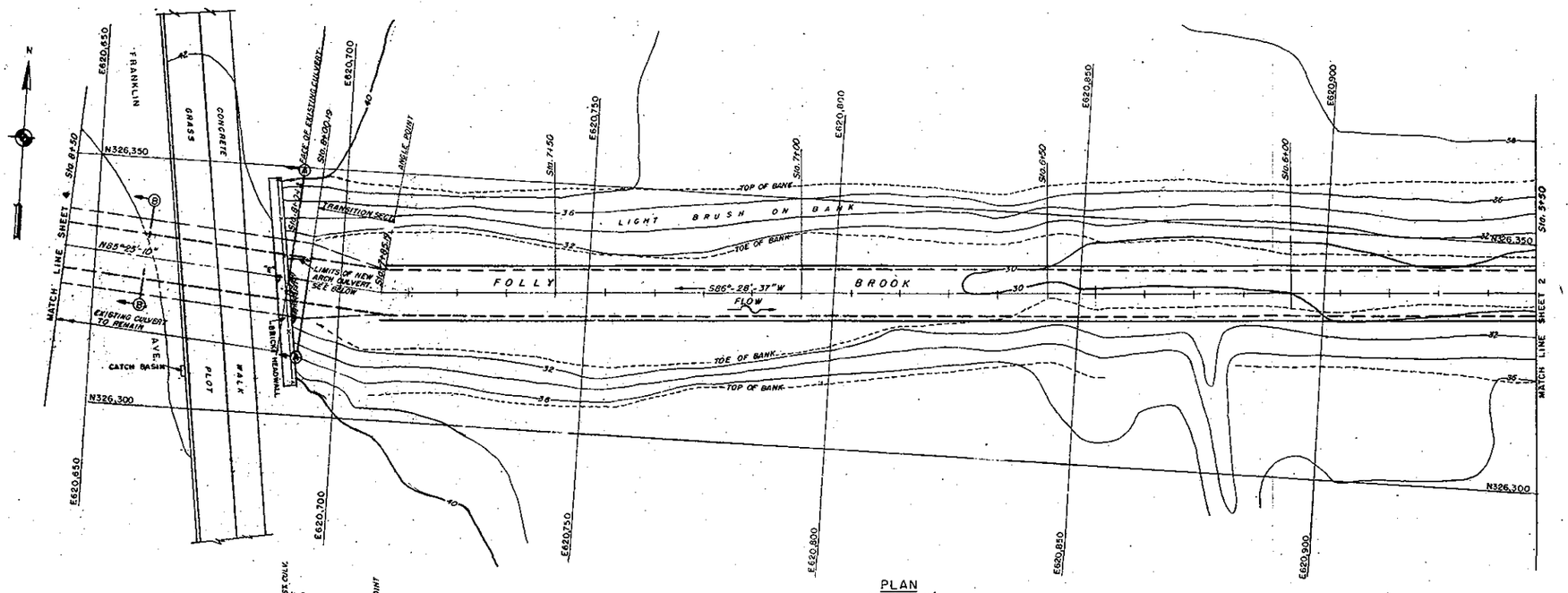
PROJECT ENGINEER
SUBMITTED BY
CHIEF, ENGINEERING DIVISION
APPROVED
CHIEF ENGINEER OR DIV.

CONNECTICUT RIVER FLOOD CONTROL
FOLLY BROOK CONDUIT
PLAN AND PROFILE NO. 2

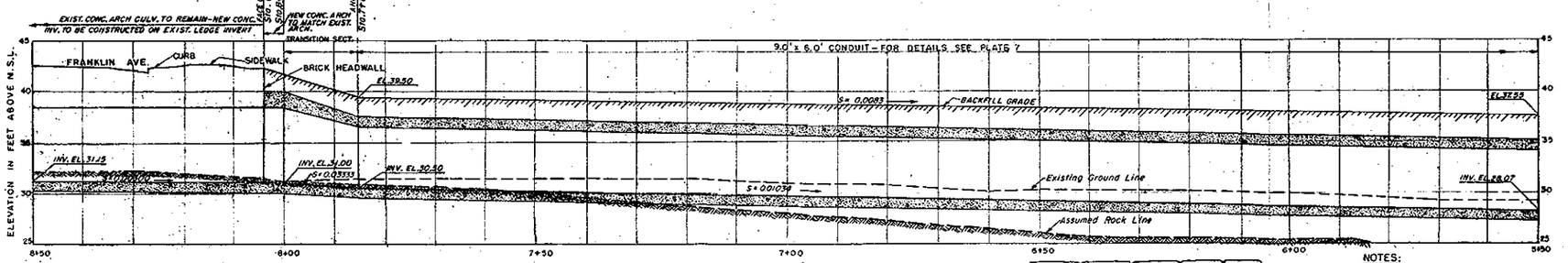
HARTFORD CONNECTICUT
APPROVED DATE MAY 1955
LT. COL. C. E. FOR THE DIVISION ENGINEER

TO ACCOMPANY DESIGN MEMORANDUM
DATE: MAY 1955

SCALES AS SHOWN
DRAWING NUMBER
CT-4-4052
SHEET OF

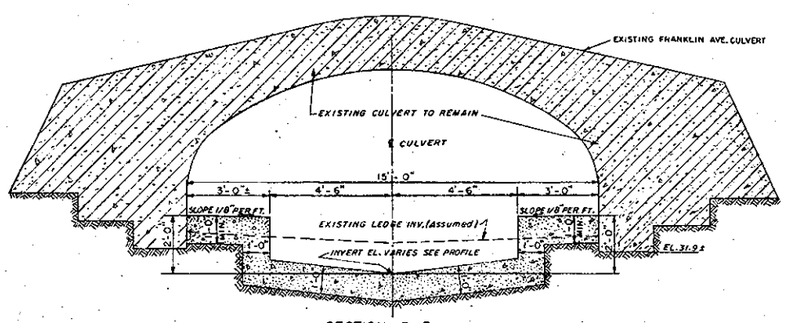


PLAN
SCALE: 1" = 10'

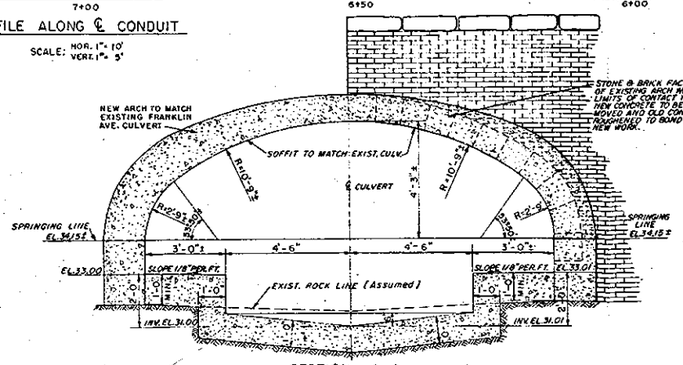


PROFILE ALONG ℄ CONDUIT
SCALE: HOR. 1" = 10'
VERT. 1" = 5'

NOTES:
Traverse Station "E" is a drill hole in stone coping over east face of Franklin Ave. culvert, Elevation 42.25 M.S.L. Coordinates of "E" N 326,327.37 - E620,687.33.



SECTION B-B
SCALE: 1/2" = 1'-0"



SECTION A-A
SCALE: 1/2" = 1'-0"

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
S.G.	S.G.	

PROJECT ENGINEER

SUBMITTED BY: CHIEF PLANNING & REPTS. BRANCH

APPROVED: CHIEF ENGINEERING DIV.

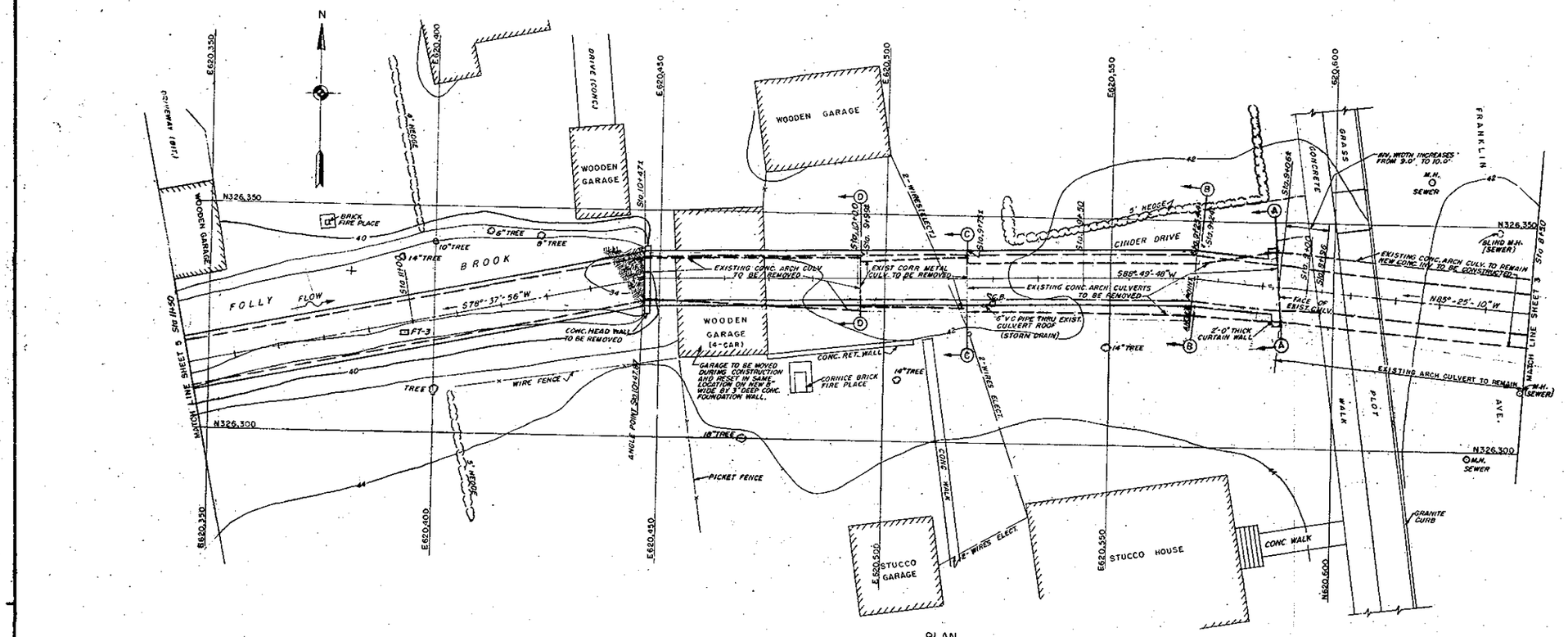
CONNECTICUT RIVER FLOOD CONTROL
FOLLY BROOK CONDUIT
PLAN AND PROFILE NO. 3
HARTFORD CONNECTICUT

APPROVED: LT. COL. C.E. FOR THE DIVISION ENGINEER
DATE MAY 1955

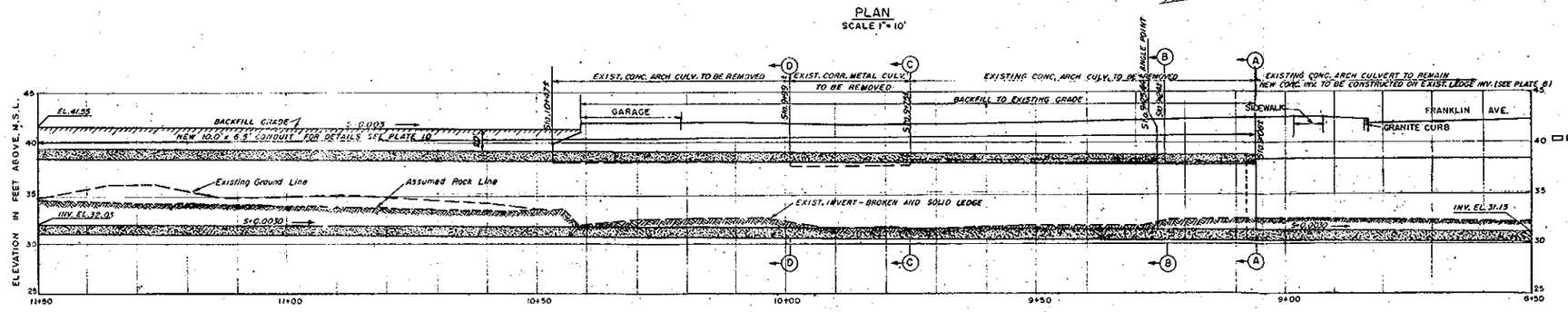
TO ACCOMPANY DESIGN MEMORANDUM DATED: MAY 1955

SCALES AS SHOWN
DRAWING NUMBER
CT-4-4053
SHEET OF

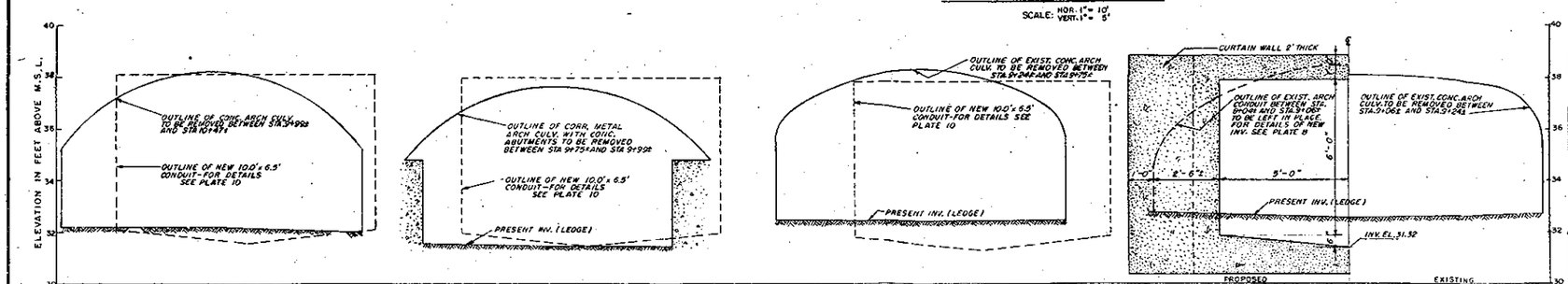
PLATE 8



PLAN
SCALE 1"= 10'



PROFILE ALONG ℄ CONDUIT
SCALE: HOR. 1"= 10' VERT. 1"= 5'



SECTION D-D | SECTION C-C | SECTION B-B

SECTIONS THRU EXISTING CULVERTS TO BE REMOVED
SCALE: 1/2" = 1'-0"

SECTION A-A
SECTION SYMMETRICAL ABOUT ℄
SCALE: 1/2" = 1'-0"

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
S.G.	S.G.	A.F.P.

PROJECT ENGINEER
SUBMITTED BY
CHIEF PLANS & RPT'S BRANCH
APPROVED
CHIEF ENGINEERS DIV.

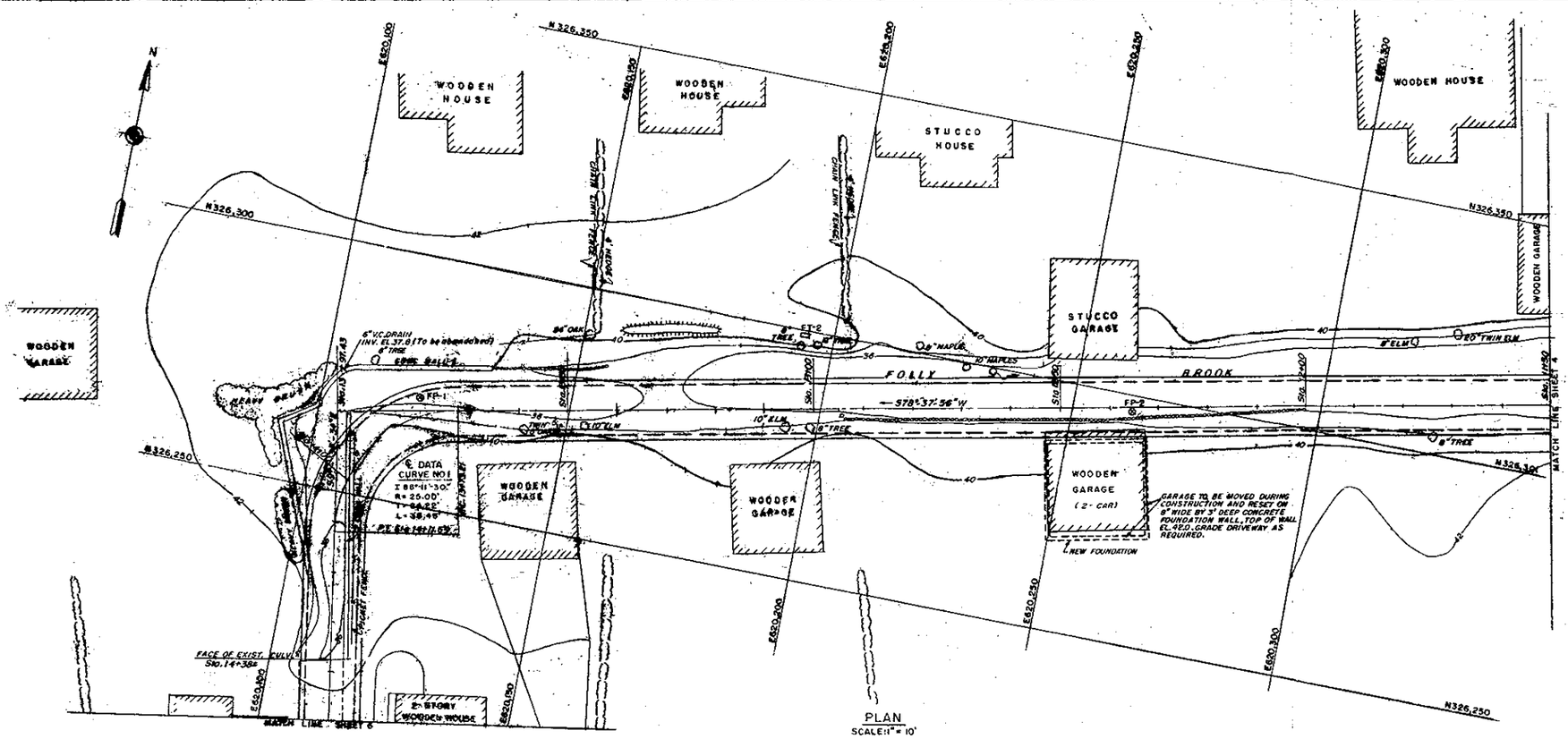
CONNECTICUT RIVER FLOOD CONTROL
FOLLY BROOK CONDUIT
PLAN AND PROFILE NO. 4
HARTFORD CONNECTICUT

APPROVED
Lt. Col. C.E., FOR THE DIVISION ENGINEER
DATE MAY 1955

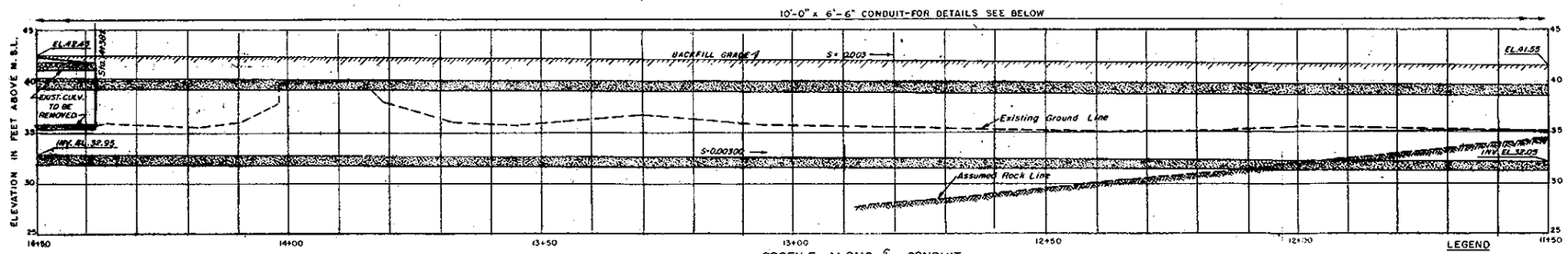
TO ACCOMPANY DESIGN MEMORANDUM DATED: MAY 1955

SCALES AS SHOWN
DRAWING NUMBER CT-4-4054
SHEET OF

PLATE 9

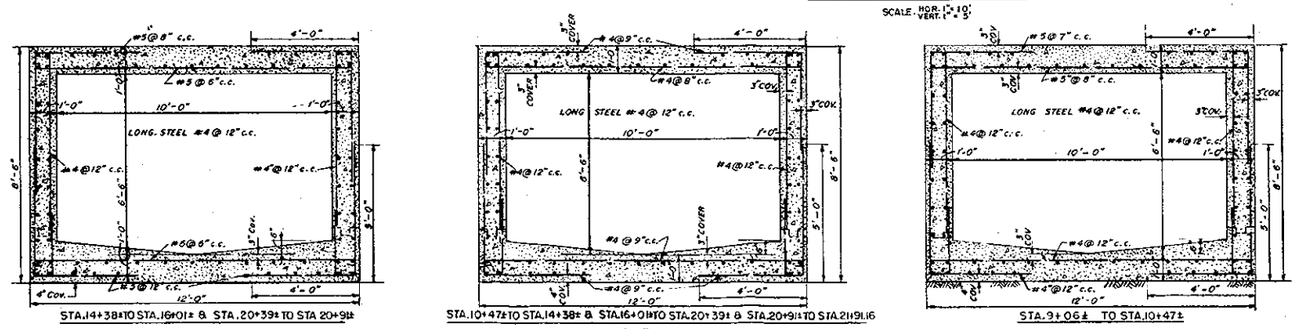


PLAN
SCALE 1" = 10'



PROFILE ALONG ℄ CONDUIT
SCALE: HOR. 1"=100'
VERT. 1"=10'

LEGEND
FT-2 Foundation Test Pit. For log, see plate 5
FP-2 Foundation Probe. For results, see plate 5



STA.14+38±TO STA.16+01± & STA.20+39± TO STA 20+91±

STA.10+47±TO STA.14+38± & STA.16+01±TO STA.20+39± & STA.20+91±TO STA.21+91.16

STA.9+06± TO STA.10+47±

10'-0" x 6'-6" CONDUIT DETAILS
SCALE 1/2"=1'-0"

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
S.G.	S.G.	

PROJECT ENGINEER
SUBMITTED BY
CHIEF PLANS & SPEC'S BRANCH
APPROVED
CHIEF ENGINEERING DIV.

CONNECTICUT RIVER FLOOD CONTROL
FOLLY BROOK CONDUIT
PLAN AND PROFILE NO.5

HARTFORD CONNECTICUT

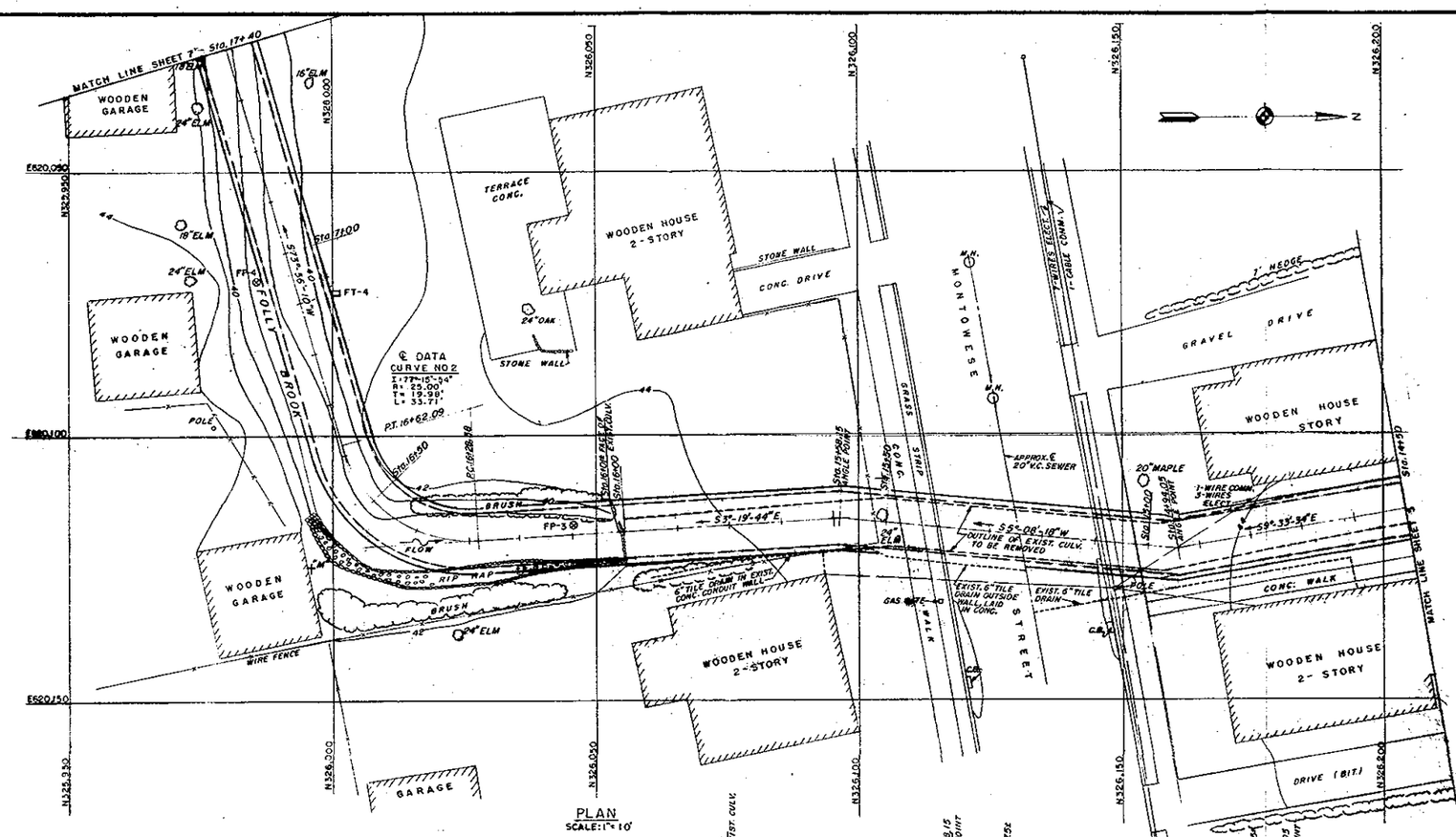
APPROVED
LT. COL. C.E. FOR THE DIVISION ENGINEER
DATE MAY 1955

TO ACCOMPANY DESIGN MEMORANDUM DATED: MAY 1955

SCALES AS SHOWN
DRAWING NUMBER
CT-4-4055
SHEET OF

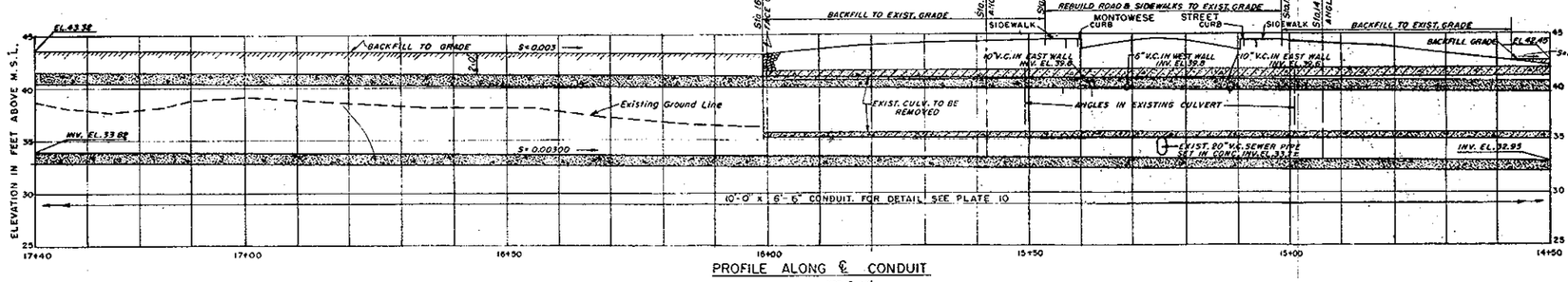
CORPS OF ENGINEERS

U. S. ARMY



PLAN

SCALE: 1" = 10'



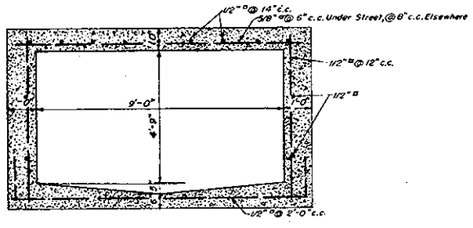
PROFILE ALONG ℄ CONDUIT

SCALE: HOR. 1" = 10' VERT. 1" = 5'

LEGEND

FT-4 Foundation Test Pit For log see Plate 5

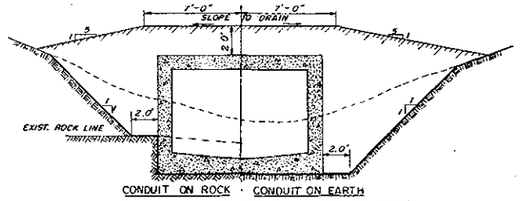
FP-4 Foundation Probe For results see Plate 5



SECTION THRU EXISTING MONTOWESE ST. CULVERT

(TO BE REMOVED)

SCALE: 1/2" = 1'-0"



CONDUIT ON ROCK · CONDUIT ON EARTH

PAYMENT LINES FOR EXCAVATION & BACKFILL

STA. 9+06± TO STA. 21+91.16 EXCEPT WHERE NOTED OTHERWISE ON PLAN

SCALE: 1/4" = 1'-0"

NOTES

Existing 6" and 10" drains to be lowered to discharge into new conduit.

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
S.G.	S G	C.A.P.

CONNECTICUT RIVER FLOOD CONTROL

FOLLY BROOK CONDUIT

PLAN AND PROFILE NO. 6

PROJECT ENGINEER: W. B. Hayford

SUBMITTED: Chief, Plans & Arpts. Branch

APPROVED: Chief, Engineering Div.

HARTFORD CONNECTICUT

APPROVED: Lt. Col. C.E., for the Division Engineer

DATE: MAY 1955

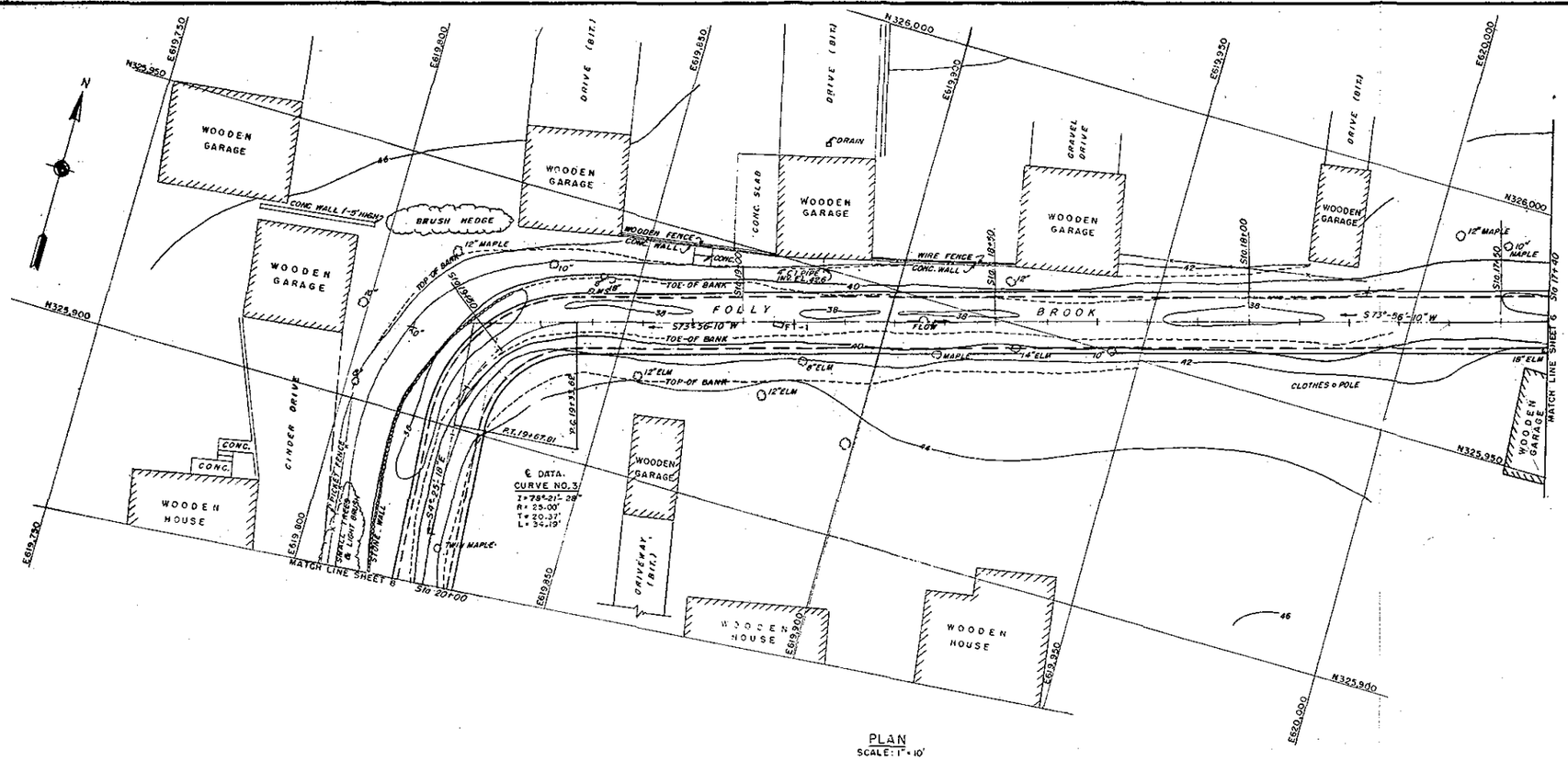
TO ACCOMPANY DESIGN MEMORANDUM DATED MAY 1955

SCALES AS SHOWN

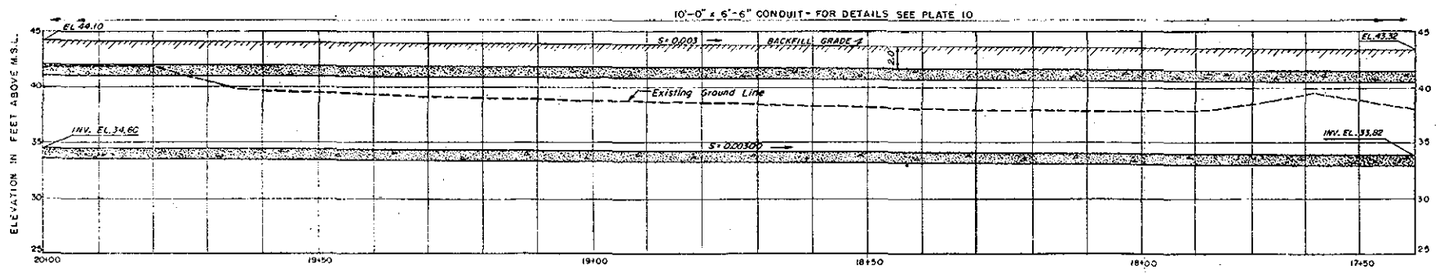
DRAWING NUMBER CT-4-4056

SHEET 6 OF

PLATE 11



PLAN
SCALE: 1" = 10'



PROFILE ALONG ℄ CONDUIT
SCALE: HOR. 1" = 10'
VERT. 1" = 5'

LEGEND
FT-1 Foundation Test Pit For log see Plate 5

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS. U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
S.G.	S.G.	

CONNECTICUT RIVER FLOOD CONTROL
FOLLY BROOK CONDUIT
PLAN AND PROFILE NO. 7

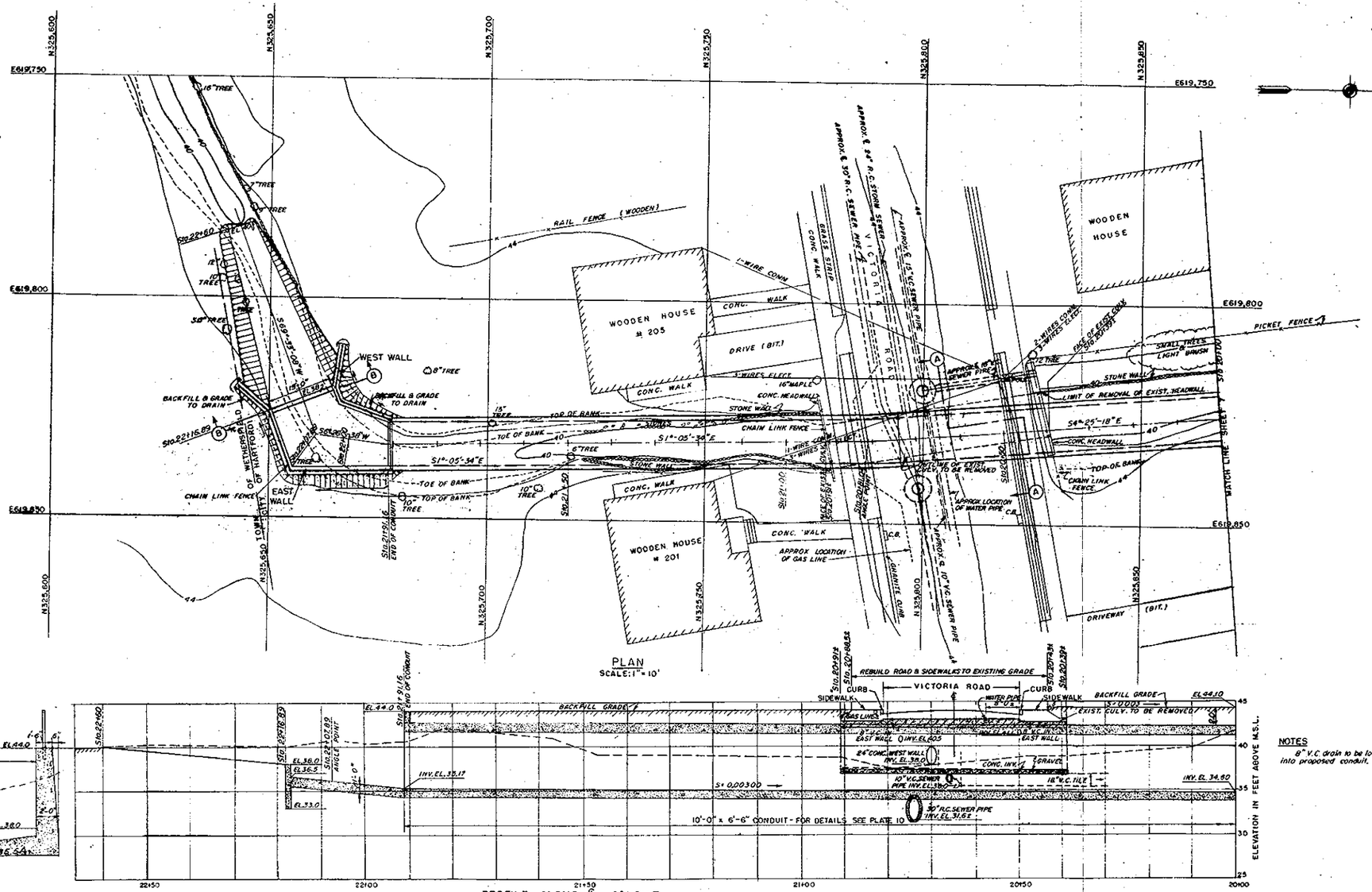
PROJECT ENGINEER
SUBMITTED BY: CHIEF PLANS SECT. U.S. BRANCH
APPROVED: CHIEF ENGINEERING DIV.
HARTFORD CONNECTICUT
APPROVED: LT. COL. C.E. FOR THE DIVISION ENGINEER
DATE MAY, 1955

TO ACCOMPANY DESIGN MEMORANDUM DATED: MAY 1955

SCALES AS SHOWN
DRAWING NUMBER
CT-4-4057
SHEET 7 OF

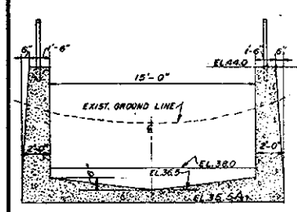
CORPS OF ENGINEERS

U. S. ARMY



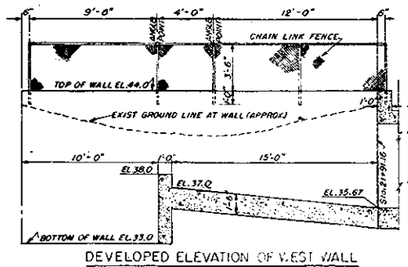
PLAN
SCALE: 1" = 10'

NOTES
8" V.C. drain to be lowered to discharge into proposed conduit.

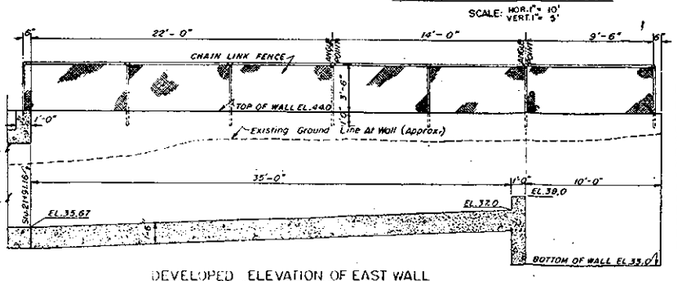


SECTION B-B
SCALE: 1/4" = 1'-0"

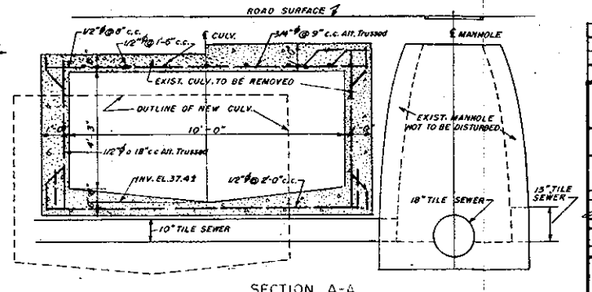
PROFILE ALONG ℄ CONDUIT
SCALE: HOR. 1" = 10' VERT. 1" = 5'



DEVELOPED ELEVATION OF WEST WALL
SCALE: 1/4" = 1'-0"



DEVELOPED ELEVATION OF EAST WALL
SCALE: 1/4" = 1'-0"



SECTION A-A
SCALE: 1/2" = 1'-0"

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
S.G.	S.G.	

CONNECTICUT RIVER FLOOD CONTROL
FOLLY BROOK CONDUIT
PLAN AND PROFILE NO. 8

PROJECT ENGINEER
SUBMITTED BY: CHIEF PLANS & SPEC'S BRANCH
APPROVED: CHIEF ENGINEERS DIV.

HARTFORD CONNECTICUT
APPROVED DATE MAY 1955
LT. COL. C.E., FOR THE DIVISION ENGINEER

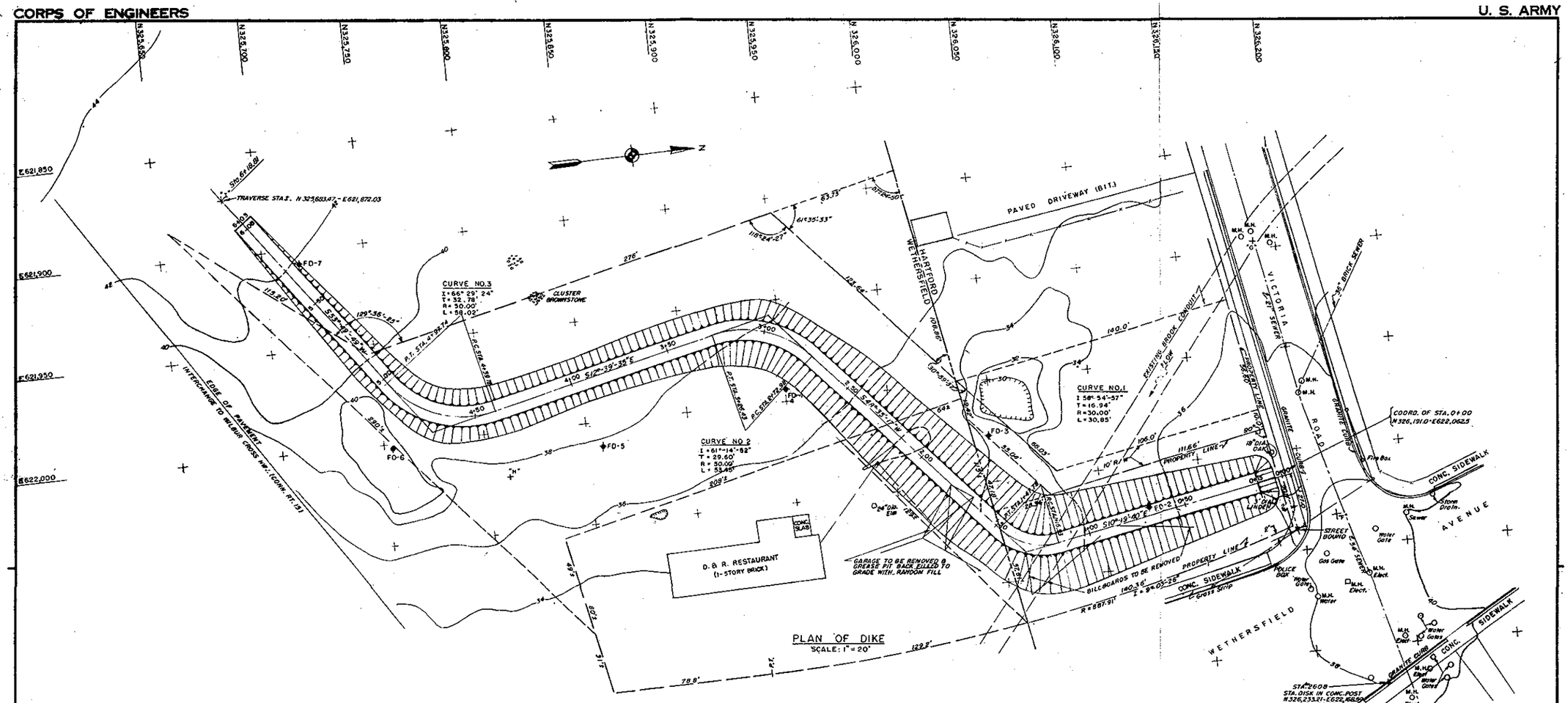
TO ACCOMPANY DESIGN MEMORANDUM DATED: MAY 1955

SCALES AS SHOWN
DRAWING NUMBER
CT-4-4058
SHEET 9 OF

PLATE 13

CORPS OF ENGINEERS

U. S. ARMY



REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
L.K.P.	S.B.	CAB

CONNECTICUT RIVER FLOOD CONTROL
FOLLY BROOK DIKE

GENERAL PLAN, PROFILE & SECTION

PROJECT ENGINEER
SUBMITTED BY
CHIEF PLANS, BR'T'S BRANCH
APPROVED
CHIEF ENGINEERING DIV.

HARTFORD CONNECTICUT

APPROVED
LT. COL. C.E., FOR THE DIVISION ENGINEER
DATE MAY 1955

TO ACCOMPANY DESIGN MEMORANDUM DATED: MAY 1955

SCALES AS SHOWN

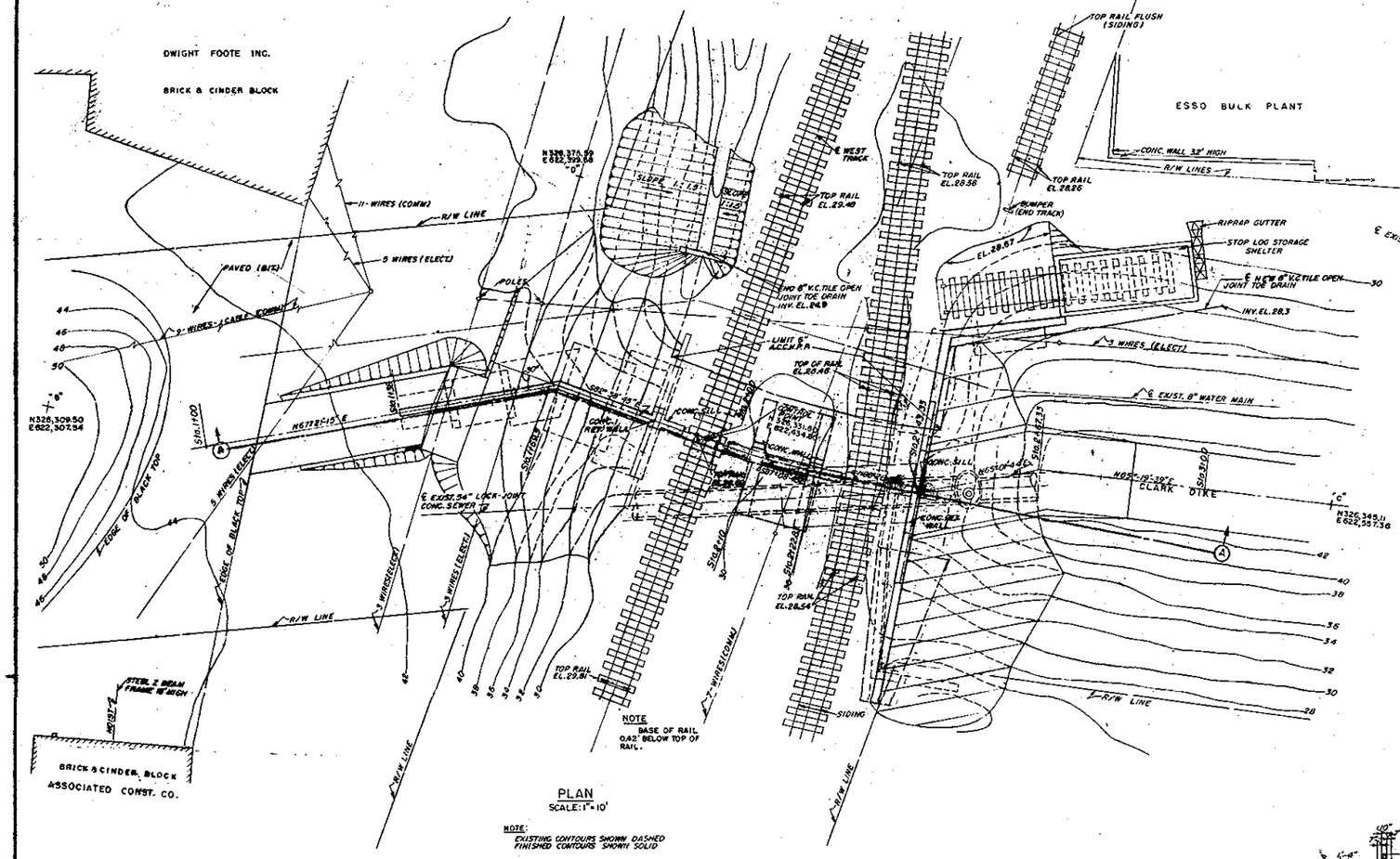
DRAWING NUMBER
CT-4-4059

SHEET OF

PLATE 14

CORPS OF ENGINEERS

U. S. ARMY



REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
A.B.	S.G.	AB

PROJECT ENGINEER
SUBMITTED
CHIEF, ENGINEERING BRANCH
APPROVED
CHIEF ENGINEER DIV.

CONNECTICUT RIVER FLOOD CONTROL
SOUTH END DIKE & STOP LOG STRUCTURE
GENERAL PLAN & SECTION

HARTFORD CONNECTICUT

APPROVED
LT. COL. C.E., FOR THE DIVISION ENGINEER

DATE MAY 1955

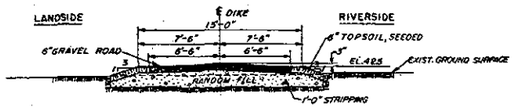
TO ACCOMPANY DESIGN MEMORANDUM DATED: MAY 1955.

SCALES AS SHOWN

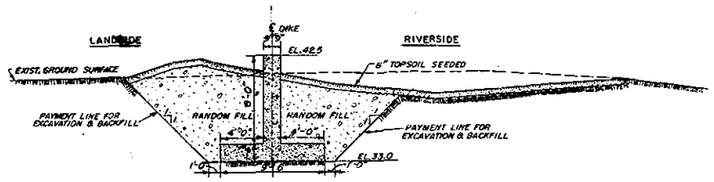
DRAWING NUMBER
CT-4-4060

SHEET OF

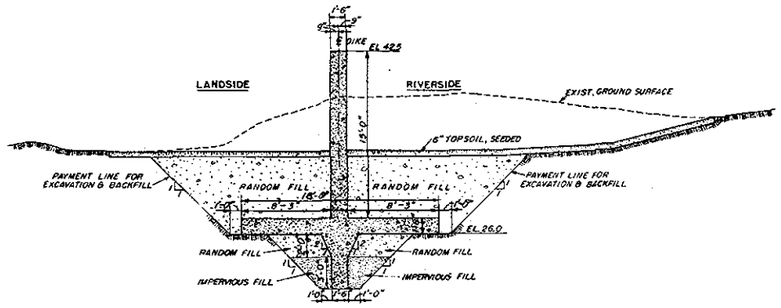
PLATE 15



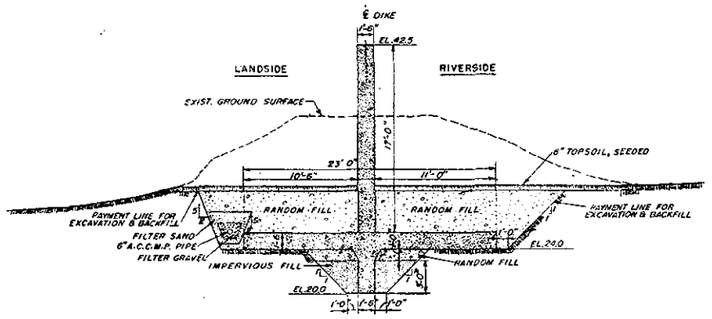
STA. 1+30
SCALE: 1" = 5'



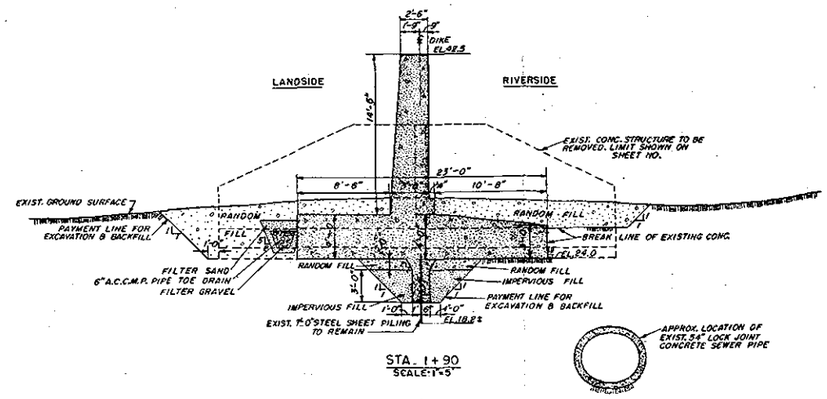
STA. 1+50
SCALE: 1" = 5'



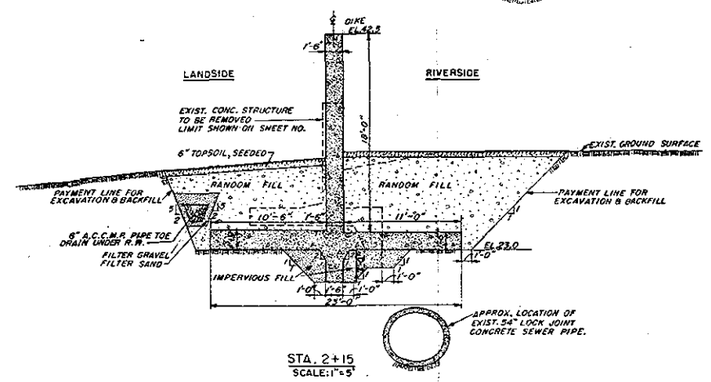
STA 1+75
SCALE: 1" = 5'



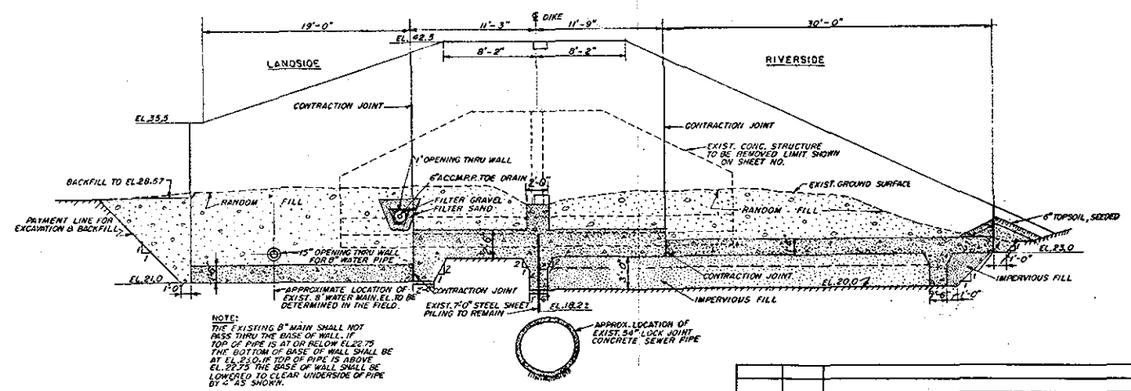
STA. 1+88
SCALE: 1" = 5'



STA. 1+90
SCALE: 1" = 5'



STA. 2+15
SCALE: 1" = 5'



NOTE:
THE EXISTING 8" MAIN SHALL NOT PASS THRU THE BASE OF WALL. IF TOP OF PIPE IS AT OR BELOW EL. 23.75 THE BOTTOM OF BASE OF WALL SHALL BE AT EL. 23.0. IF TOP OF PIPE IS ABOVE EL. 23.75 THE BASE OF WALL SHALL BE LOWERED TO CLEAR UNDERSIDE OF PIPE BY 4" AS SHOWN.

STA. 2+40
SCALE: 1" = 5'

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
A.B.	S.G.	AB

PROJECT ENGINEER
SUBMITTED BY
CHIEF, PLANS & SPEC'S BRANCH
APPROVED
CHIEF ENGINEERING DIV.

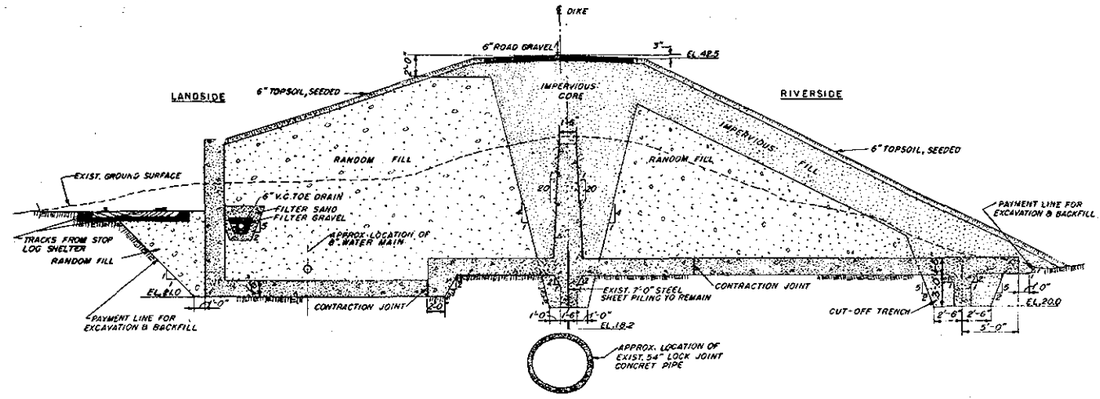
CONNECTICUT RIVER FLOOD CONTROL
SOUTH END DIKE & STOP LOG STRUCTURE
SECTIONS NO.1

HARTFORD CONNECTICUT
APPROVED DATE MAY 1955
LT. COL. C.E. FOR THE DIVISION ENGINEER

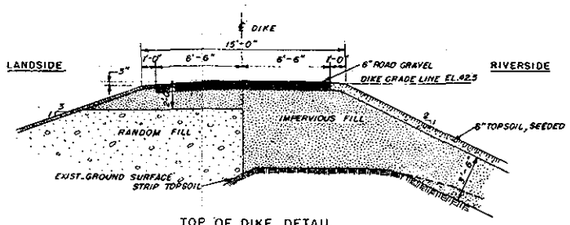
TO ACCOMPANY DESIGN MEMORANDUM DATED: MAY 1955

SCALE: AS SHOWN
DRAWING NUMBER
CT-4-4061
SHEET OF

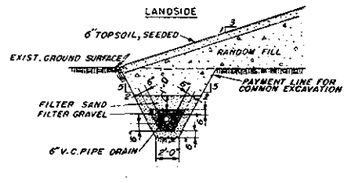
PLATE 16



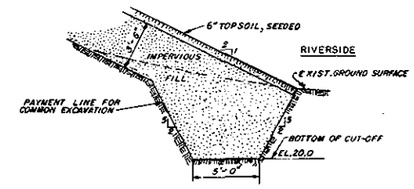
STA 2+45
SCALE: 1" = 5'

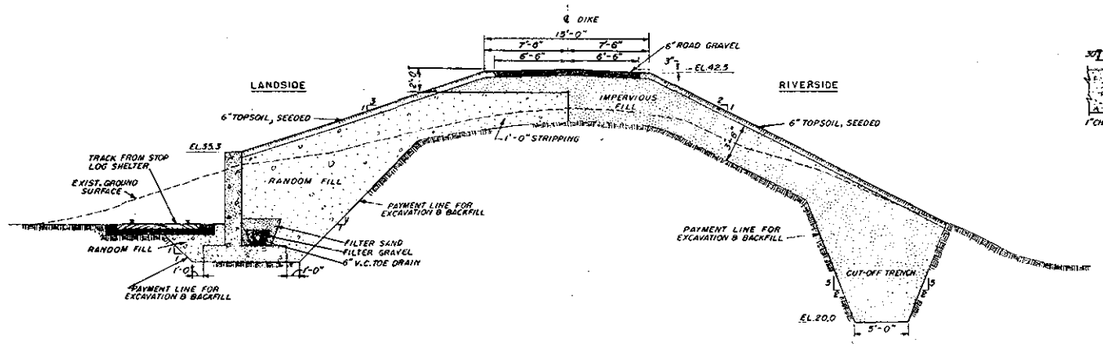


TOP OF DIKE DETAIL
SCALE 1/4" = 1'-0"

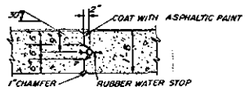


TOE TRENCH
SCALE: 1/4" = 1'-0"

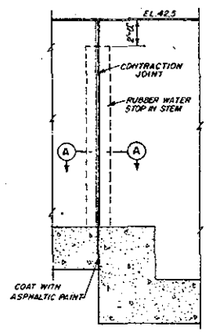




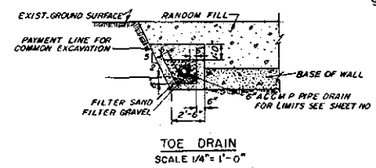
STA 2+60
SCALE: 1" = 5'



SECTION A-A
SCALE: 1/2" = 1'-0"



CONTRACTION JOINT DETAIL
SCALE: 1/4" = 1'-0"



TOE DRAIN
SCALE 1/4" = 1'-0"

CUT-OFF TRENCH
SCALE: 1/4" = 1'-0"

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
BOSTON, MASS.

DR. BY	TR. BY	CK. BY
A. B.	S.G.	A.B.

PROJECT ENGINEER
SUBMITTED BY
CHIEF PLANS BRANCH
APPROVED
CHIEF ENGINEERING DIV.

CONNECTICUT RIVER FLOOD CONTROL
SOUTH END DIKE & STOP LOG STRUCTURE
SECTIONS NO. 2

HARTFORD CONNECTICUT
APPROVED
LT. COL. C. E. FOR THE DIVISION ENGINEER
DATE MAY 1955

TO ACCOMPANY DESIGN MEMORANDUM
DATED MAY 1955.

SCALES AS SHOWN
DRAWING NUMBER
SHEET OF

PLATE 17